

your computer

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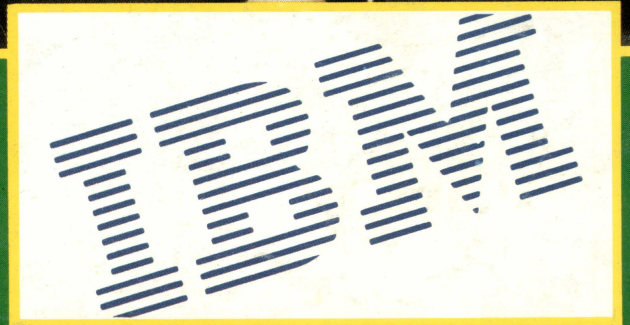
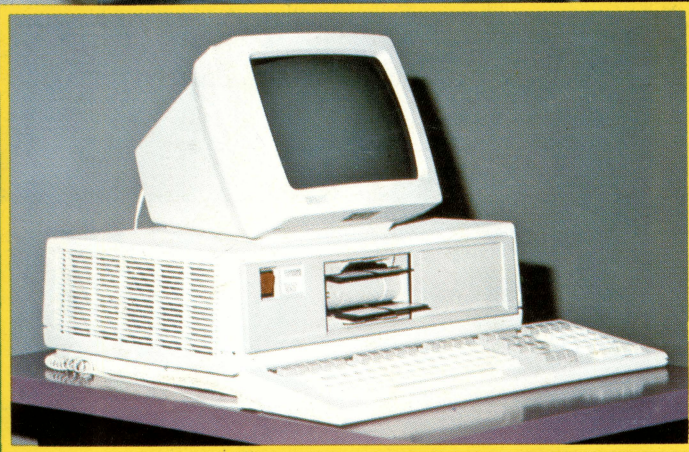
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inside your computer

Vol 1, No 12. June 1982

special

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Annual Index

A full index to *Your Computer's* first year, cross-referenced by category. You should have a copy of this!

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Your Computer News

Our roundup of the latest in software and hardware, new and upcoming releases and happenings in the world of microcomputers.

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First Local Test: IBM!

YC has laid its hands on one of the first IBM Personal Computers in the country. Here's what we think...

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Delicious DEC's

The big guns really are 'moving in' on the personal computer market.

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A Likely Latin

Olivetti joins the fray at last, with the M20 micro.

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BASIC For Babysitters

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ZX80 Hot-Up

Yes, it got 'lost' last issue ...here's how to cure some of the small but annoying problems that limit your little Sinclair.

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Off To The Faire

A visitor's view of the West Coast Computer Faire.

67

Pocket Programs Special

As promised last month, here are a whole lot more pocket programs — more than ten pages worth for you to try this time, including ones for the VIC and the Peach.

business

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Business Machine Survey

Part 2 of our detailed run-down of business micros. This month we try another major database packages, and review three machines:

- Toshiba T-200
- Commodore 8096
- Dick Smith Business System

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Not Another CPM Review

Job scheduling and planning made easy with Critical Path Method (CPM) design — a Milestone program...

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52

Basic For Birdwatchers

Part VII of Les Bell's instructional series on BASIC. This month, a telephone directory program.

99

Understanding Assembler

After last month's break into the communications field, we return to our tutorial series in earnest.

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48

Sharps Compared

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Nevada Cobol

An excellent package that was able to reverse our thinking on the language.

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Colouring The Apple

Imagineering's Digitek cards for the Apple are low-cost and effective peripherals that tend to put the costly originals to shame.

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Heard On The Bus

Leon Yendor, our resident computer social conscience, speaks out.

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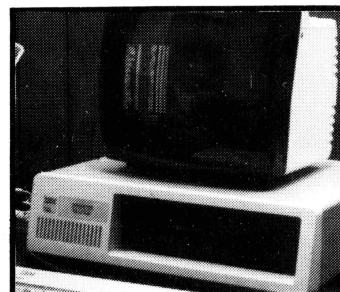
Popular Systems

In fact, they're becoming too popular — we couldn't fit some in again this month! However, we do have most, including last month's missing items.

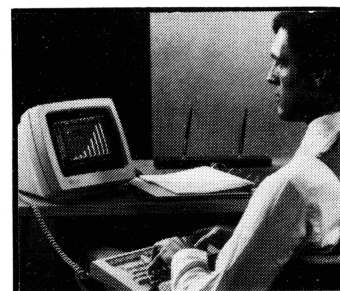
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Readers' Services

Want to contribute a story, write a program, ask a question, subscribe, sue us or...? Read this first.



Here it is, early or not...Les Bell examines the IBM PC for the first local test of this impressive machine. It's on page 20.



But if we were impressed by the IBM when it was announced, we didn't count on DEC's rapid retaliation. See Page 40.

Next Month!

Guilty, Guilty.....!

The forces of evil are conspiring, and so on: the printer reviews planned for this issue and mentioned on the cover have had to be held over. Abject apologies.

More Business Machines

Part three of our business micro survey, with more full reviews.

Pocket Programs Ride Again

Another series of reader-contributed programs for you to use.

editorial

IT'S SELF-INDULGENCE time, if only briefly: I have to take time out here to record the joyous (we hope you agree) occasion of Your Computer's first birthday.

Without patting ourselves on the back too much, I think it's fair to say Your Computer has set standards in its first year.

It has set standards in value for money, both with the cover price (at \$2, it remains unchanged from the first issue) and with an equitable editorial/advertising ratio that provides plenty of reading, on worthwhile subjects, every month.

It has set standards that have been acknowledged world-wide in its provision of useful and comprehensible tutorials for beginners. They have been acknowledged in a more concrete form than praise, too — Les Bell has been contracted by a major book publisher to develop these tutorial series into paperbacks that will be sold internationally.

It has set standards in editorial format, by sourcing virtually all material locally — quality material, written by Australians about the Australian user, seller, newcomer and the equipment available in this country.

It has set standards in several other areas, but perhaps the most important is in the level of communication with readers through the magazine's pages. We're taking part in the personal computer experience with you, not just reporting it to you.

We're not perfect, but we're a lot closer to it than we were a year ago when our first issue was acclaimed as a trend-setter. We're striving to make sure we're closer still by this time next year.

We believe you like Your Computer. Your often-voiced support is backed up by our sales, which are increasing overall despite a depressed national magazine market.

We're not into empty boasting, or making claims that can't be supported, but we believe you have made this magazine the clear leader — both in sales, and reader loyalty — in the personal computer market. We will be backing that statement up by submitting our records for independent audit.

When that is done our belief will become a factual, supportable claim. And anyone who wants to challenge that claim is invited to unlock their filing cabinets and let the auditors in... □

Matt Whelan
Managing Editor

Editor: Les Bell
Art Director: Michelle Mabbott
Advertising Manager: David McDowell
Managing Editor: Matt Whelan
Office Services: Joy Quinn

CONTRIBUTORS: **Australia** — Brendan Akhurst, Shane Andersen, Dr John Barrett, John Batty, Bill Bolton, Paul Beaver, David Brudenall, Geoff Cohen, Errol The Cat, Frank Linton-Simpkins, Bref Ruhl, Peter Sandys, R G Stevenson, Greg Stringer, Keith Stewart, Fred Symes, Leon Yendor. **New Zealand** — Peter Isaac. **UK** — Peter Docherty. **United States** — Daniel Montague. US news items via The Source, from Hamsource public files created by Dwight Ernest (TCU366, New York) and W5YI, Fred Maia.

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It's hard work running a small business.

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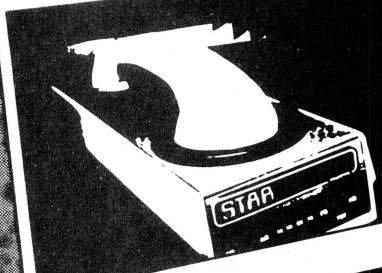
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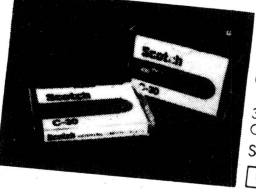
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ICL Makes Its Point

BRITISH computer giant ICL has set out to stake its claim to a share of the micro market with the release of the ICL Personal Computer, as well as an ambitious scheme for marketing through retailers, software and system houses and OEMs.

At a large launch at Sydney's Hilton, ICL announced its plans for aggressively marketing its new personal computing (and larger) products, which range from the ICL Personal Computer up to the ME29, a fair-sized mini.

Basically, ICL seems to be willing to sell anything it can through anyone it can get to flog it. While ICL's marketing strategy is obviously not as rough as that, the stores are going to be full of ICL PC's this year — the margins it is offering will see to that.

At the bottom of the line is the ICL Personal Computer. This is basically the Rair Black Box, with a bit of a re-work done.

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come with a five megabyte micro-Winchester drive, and can take a lot more memory (up to 256 K), allowing them to run MP/M 2, which will be available in August.

The star of ICL's launch was the PERQ, which ICL sells under licence from Three Rivers Corporation, a group of ex-Xerox employees. The PERQ has the most stunning high-resolution graphics we have ever seen, with animation a snap. The processor is a custom built job which can execute over a million Pascal p-codes per second.

As an executive workstation, the PERQ is superb. The only problem is the price, which ICL is committed to reduce by 20 percent a year (if you have to ask the price, then you can't afford it, Mr Rockefeller).

Something that tickled our fancy was the DRS-20 distributed resource computer. Powered by anywhere between three and five 8085 microprocessors, this beastie

A slightly baffling product was the new ICL WordSkill word processing system. Based on an earlier Nexos design, this machine uses the 8086 microprocessor, and ICL is arranging to put the new Concurrent CP/M-86 onto it, as well as network communications and some other goodies. This seems to be a sleeping product which is going to wake up and discover it's really a computer.

Pricing on all these products is competitive, so ICL seems to be serious about the micro market. □

Rokenie Release

ROKENIE Computer Systems, Australian distributor for Southeast Micro Systems of the US, has announced three new products for the Australian market.

They are the SX-9 6809 computer systems, the DM-256 256K dynamic RAM board for the SS-50 bus, and VDISK, an extended memory, virtual disk system.

The SX-9 ranges from 128K

sections. It's a multi-user system.

Other notable features of the product are a label printing facility and the ability to interface the database for use in conjunction with other programs such as BOS/5 products AutoClerk (report generator) and AutoWriter (word processing).

BOS/5 is available on over 50 different computers. Amongst the most popular are DEC PDP/11, National Panasonic, North Star Horizon, Onyx and MicroMax.

Further details on all BOS/5 products are available from Computer Power, Micro-Products Division, 6 Bay Street, Port Melbourne, 3207. □

TAO Newsletter

DEBORAH Morton, director of Sydney software company The Automated Office, has announced a microcomputer newsletter which covers topics of interest to corporate microcomputer users.

The current issue discusses

and from disk, enabling you to transmit your password fast and efficiently to any data base), suppression of the echo on your screen if required (ensures confidentiality), transmission and reception at half or full duplex, and transmission from one micro to the next which can be interrupted by entering a chat mode while the integrity of incoming data remains intact.

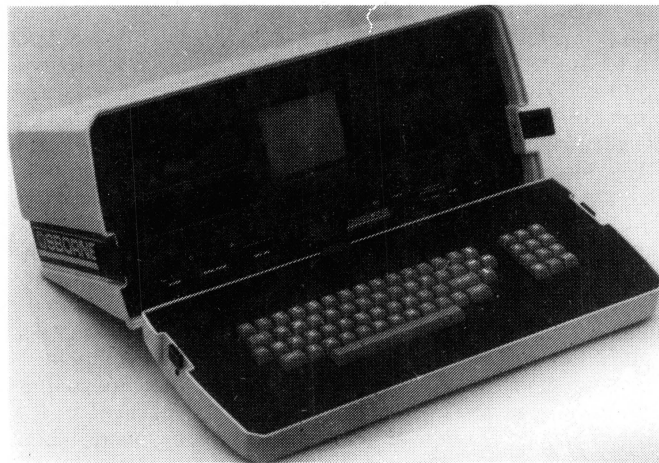
Disk files can be viewed, incoming ASCII data can be reviewed, saved to disk or ignored.

Available at \$65, Software Source will provide copies on all Sorcerer disk formats.

For further information contact: Software Source, 89 Oxford Street, Bondi Junction, 2022. □

Osborne In Australia

OSBORNE Computer Corporation has established an Australian subsidiary headed by Richard Graham, former general manager of Compu-terland Australia.



Osborne Computer Corporation Australia will be fully operational in July — marketing and supporting the company's unique computer and accompanying software throughout Australia.

The Osborne O-1 packages a complete business computer including display screen, disk drives and communications capabilities into a briefcase-sized unit weighing only 11kg and small enough to fit under

a standard airline seat.

The computer's low price of \$2595 includes some of the most popular and powerful software available — Wordstar word processing with MailMerge mailing list maintenance, SuperCalc electronic spreadsheet and CBASIC and MBASIC for programming; all operating under the CP/M operating system.

For further information

write to: Osborne Computers Australia, PO Box 690, Neutral Bay, 2089. □

Corner Computer Store

COMPUTERMAX, on busy Pittwater Road at Brookvale, Sydney, is the newest addition to the growing number of 'friendly corner computer stores' where, the owners say, you will find old-fashioned service along with the latest technological marvels of the computer age.

They say it is because of the high technological nature of computers, even the so-called 'friendly' types, that personal service is essential before, during and after the decision to purchase is made.

They see the personal computer is a servant that can save time, entertain, control or even guard your home 24 hours a day. Max and Hilary Leonard aren't quite up to the 24-hour level, but do offer personal service six days a week at their new showroom in Brookvale. □



When IBM® built their newest toolbox, they came to Microsoft for tools.

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Who's Who. Microsoft has developed languages, utilities, and hardware for Apple™, TRS-80™, Xerox™, CP/M™, Atari™, and IBM. We have tools for your computer like the Ramcard, Softcard, Cobol, Fortran, TASC, muMath, Typing Tutor, Level III Basic, muLisp, and many more. For your nearest dealer, ring (02) 451-1490.

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Micro Advisor

DAVID DIPROSE, owner of Computer Galerie in North Sydney, has been appointed consultant to ICL (International Computer Limited) to advise on developments in retailing.

"The advent of computer retailing has led to an enormous shift in awareness among small businessmen and a consequent change in approach to customer service," Mr Diprose says.

"There are now 138 micro-computers available in Sydney, of which 60 have been released since Christmas.

"The key to good retailing is to assist the customer to avoid bewilderment. This is done by marketing firm recommendations and hardware. The second is was the provision of reliable service."

Mr Diprose will advise ICL on these two key points. □

Australian Option II

A MELBOURNE computer company is releasing a new locally designed microprocessor to fill a need it says is currently neglected by other Australian and US manufacturers.

The company, Microprocessor Applications of Box Hill, announced the single-board Option II, which provides a low-cost threshold for users who see a future need to upgrade to a multi-user system.

MPA managing director Terry Gray said his company first noticed the need 18 months ago, not long after winning preferred supplier status for Victorian technical schools with its Micromation range of systems.

"It became apparent that many users preferred to build to multi-user status gradually to ease the strain on capital funds, and to allow staff to become familiar with the simpler system," he said.

"So we set about designing a machine which provided a much lower cost entry-

point, and a clear upgrade path to a full eight-user Micromation system," he said

"Interestingly, as our development work proceeded we found that Micromation distributors in other countries also had the need of a low cost entry system. Many have since expressed strong interest in adding the Australian designed and built Option II to their product range."

The basic configuration of the OPTION II is a single-board Z80 microprocessor, and one inbuilt double-sided 20cm disk drive giving a megabyte of storage.

The benchtop or rack mounted unit also features 128K of RAM, CP/M operating system, standard RS232 and Parallel interfaces, Copy and File transfer programs, and the ability to run MPA BASIC — a batch card reader BASIC designed for schools.

Microprocessor Applications is at 48 Rutland Road, Box Hill, 3128; phone (03) 890-0277. □

Radio Programming

THE proliferation of computing facilities in business, the professions and schools, and the prospect of being able to buy a desk-top computer to use at home, make many people want to know something about computer programming.

An initiation into the mysteries of programming is given in a course on BASIC programming that Jim Murray, of the University of New South Wales Computing Services Unit, will be broadcasting over the University's educational radio and television networks.

It comes in three parts, the first starting late in July, and runs over 14 weeks to the end of October, each lecture being broadcast twice in the same week, at 8pm on Mondays and 9pm on Fridays. Printed notes are provided, and students can come and test their programs through Radio University's computing

facilities at the University.

The fees are a modest \$22.50 for parts one and two of five radio lectures each, and \$20.00 for part three or four radio lectures. All parts include two televised lectures and two attended seminars.

The courses also come on cassette following broadcast, at \$8 per radio lecture, and \$30 or \$50 according to format for the televised lectures. Three sets of notes are supplied with the tapes, making them an ideal training medium.

Radio and Television University broadcast a broad range of courses for the continuing education of professional people on computing and other topics. For full details contact Radio University by phone on (02) 662-2691, or write to PO Box 1, Kensington, 2033. □

Idiot's Guide

ILLUSTRATING Computers explains everything from the binary system backwards for people who don't really know what computers are except that they are evil and will one day take over the world.

The hand-printed text is interspersed with drawings both helpful and humorous. Readers can see vividly how hardware and software combine to form a machine of great resourcefulness, versatility and application.

It describes the way information is stored inside the computer and how that information is used by inserting what is called a program. Examples are given of the use of computers and microcomputers, and finally the authors take a look at possible future developments.

Illustrating Computers was written by Colin Day (a computer consultant at University College, London) and Donald Alcock (a consulting engineer).

For further information contact Pan Books, 55 Clarence Street, Sydney, 2000. Phone: (02) 290-2066. □

WordPro Power

COMPUTERWARE has announced the availability of WordPro 2 Plus and WordPro 5 Plus, the highly regarded Professional Software word processing software — the best-selling software package on Commodore computers.

WordPro 2 Plus requires a minimum of 16K and is sold complete with both cassette and diskette versions and is fully compatible with CBM 2001, 4016, 4032 and 8032 computers. WordPro 5 Plus is for use on the CBM 8096.

The major benefit of WordPro 5 Plus is that it allows full use of five text areas of 169 lines each, a powerful word processing tool.

WordPro 2 Plus sells for \$239 while WordPro 5 Plus costs \$530 from Computerware at 305 La Trobe Street, Melbourne 3000; telephone (03) 602-1006. □

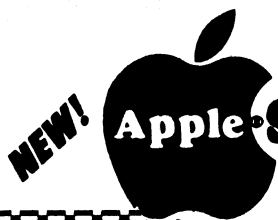
Software Database

A NEW online information source for software marketed in Australia has been developed by Infogrow and added to ICIE, a public access database available on AUSINET, a national database network.

Its scope has now been expanded to include full descriptions of applications and systems software, as well as separate product lists and supplier contact information. A major component of the file is descriptions of DEC's systems, utilities and applications software for the PDP-11 series and VAX minicomputers.

This database is of interest both to intending purchasers of equipment and to owners of existing systems who wish to develop new applications.

The software file is a valuable addition to the directory of Australian databases on ICIE previously announced by Infogrow. Infogrow is at 49 Clarence Street, Sydney, 2000, (02) 29-8742. □



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Radio Tutorials

PRACTIAL guidelines for selecting a computing system for a small business will be the theme of a lecture series to be broadcast over Radio University, the educational radio station of the University of New South Wales, starting early in June.

George Foote, Senior Consultant with Touche Ross Services and Vice-Chairman of the NSW Branch of the Australian Computer Society, will present the series of six radio lectures plus two attended seminars.

The lectures will go to air twice in the same week, at 7 pm on Tuesdays and again at 8 pm on Thursdays, over Radio University's station VL2UV, and the seminars will be held in the evening at the University of New South Wales.

All-inclusive cost for the lectures, printed notes and seminars is \$20.

For the benefit of people who have had no previous experience of computers or accountancy, Mr. Foote will start by explaining the terminology used in the computer pages of the press, and provide a written glossary of the most common terms. He will then go on to cover:

- What is a computer - what can it be used for?
- What are your options? - what help can you get?
- Requesting a proposal from a supplier - and blocking loopholes in the contract.
- Planning and installation - and staff involvement.
- Recapitulation - and the ten avoidable pitfalls.

Radio University transmits on 1720 and 1750 kHz, and can be picked up in the Sydney metropolitan area on a radio adjusted to receive these frequencies. Enrolled students are given instructions on how to adjust their own radio, or they can buy a simple transistor radio already modified for \$8 from Radio University.

Following broadcast the

series will be available on tape at \$8 per lecture, or \$48 for the complete course. Three sets of notes are provided with the cassettes, making them an ideal training medium.

People looking for an introduction to COBOL will be able to do a course on COBOL programming late in June.

According to the course lecturer, Jim Murray of the University's Computing Services Unit, COBOL (Common Business-oriented Language) is still the most widely-used computer programming language for business applications. Students do not need any prior knowledge of computing to be able to do the course.

It will teach the basics of programming, using the COBOL language, in a series of ten radio lectures, combined with two televised demonstrations. Mr. Murray will set programming exercises and students can test their solutions on one of the University's computers. He will also conduct two attended seminars at the University.

This series will be followed immediately by another course entitled Structured COBOL, which follows on from the first course and studies more advanced concepts.

The radio lectures are timed for 7 pm on Mondays, and repeated at 8 pm on Fridays.

For more information contact the Division of Postgraduate Extension Studies, 16th floor, Mathews Building, University of New South Wales, telephone 662-2691. □

National Conference

MICSIG, the Microprocessor Special Interest Group of the Australian Computer Society, will hold a national conference and exhibition on microcomputer software in August.

The venue, the Australian

Another "Superchip"

Hewlett-Packard has announced a new memory chip containing 660,000 transistors on a single quarter-inch square piece of silicon.

The new chip, a RAM (for random-access memory), is three times as densely packed as today's commercially available circuit designs, HP says.

Together with a 450,000-transistor microprocessor chip and four other chips, the new memory chip forms a complete 32-bit computer system that HP expects to market in a new computer product in about a year.

Geoff Foley, systems engineer with Hewlett-Packard Australia's Instrument Group, said HP's tiny new memory chip — which contains one and a half times the number of parts in a jumbo jet — holds the most circuitry ever built into a single chip and

proven successful in testing.

Foley said the tiny transistors are packed more tightly together than ever before: only 40 millionths of an inch separates them. This tight packing decreases the distance that an electrical signal must travel when adding, subtracting, or processing information, greatly increasing the speed of the system.

HP's new six-chip system can process 32 bits (basic units) of information simultaneously, adding two numbers in 55 billionths of a second.

The high-powered processing system was designed over a period of several years by a team of engineers at HP's Engineering Systems Operation in Ft Collins. The very large scale integration (VLSI) design was made possible by new HP one-micron NMOS-III technology. □

Join 'Em, And Beat 'Em.

ADELAIDE'S Computer Imports has set up virtually on Tandy's doorstep with a new shop at 220 Morphett Street in the city.

When founder Brook Hill saw Tandy open there in March the temptation was apparently too much to resist and so he moved quickly to acquire premises and open up in less than three weeks.

"Tandy gave us our first big break when its pricing policies in 1980 and '81 allowed us to import from Singapore, Hong Kong and the US and still leave room for margin. We're now turning over half a million a year in micros and peripherals and haven't forgotten that Tandy's regular monthly mailings keep a stream of potential customers coming to its doors".

Computer Imports handles

both Tandy and Commodore equipment and, since joining the Commodore dealer network in 1981, has seen sales skyrocket. One product to which it attributes this success has been the "Silicon Office" program which runs on the 8096 series Commodore with 96K of RAM memory and a megabyte of disk storage.

"This package essentially incorporates all the requirements of a modern office such as invoicing, stock control, control of debtors, word processing, mailing and so on in one easily modified package", says Hill.

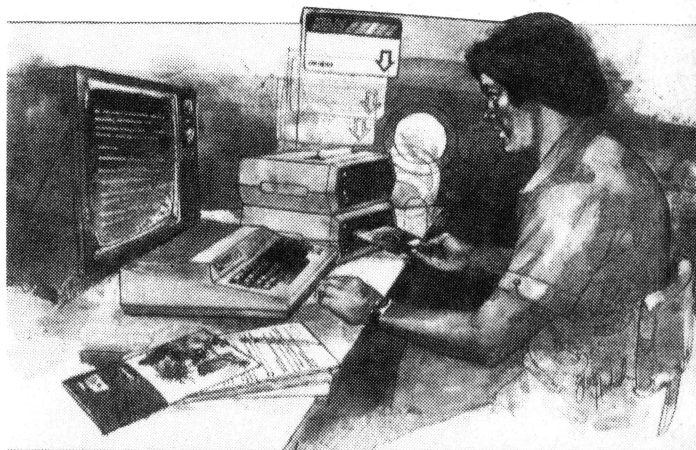
"We can now set up a suite of software packages to suit a small business in a matter of days when previously we would need to look at between 0.25 and 1.0 man years of programmer's time at \$25 to \$35 per hour." □

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NOTE: "Model I, II, III refers to the TRS-80, a product of Tandy Corporation", and "SYSTEM-80 is a product of Dick Smith Electronics".



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112	LASER BLITZ
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202	HOUSEHOLD FINANCE 3 & 4
203	VIC TRAP
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207	HOME INVENTORY
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210	CODE MAKER
211	CODE BREAKER
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305	VICVADER
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402	SKY MATHS (6K)

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411	GLOBBLER
412	THE ALIEN
413	3D MAZE
414	CAROM
415	RACEWAY
416	LASER WAR
417	DRAGON MAZE
501	JUNGLE
502	DUNE BUGGY
503	SKI-RUN
504	THE WORM
505	SUPER WORM
506	COSMIC BATTLES
507	SPACE DEFENSE
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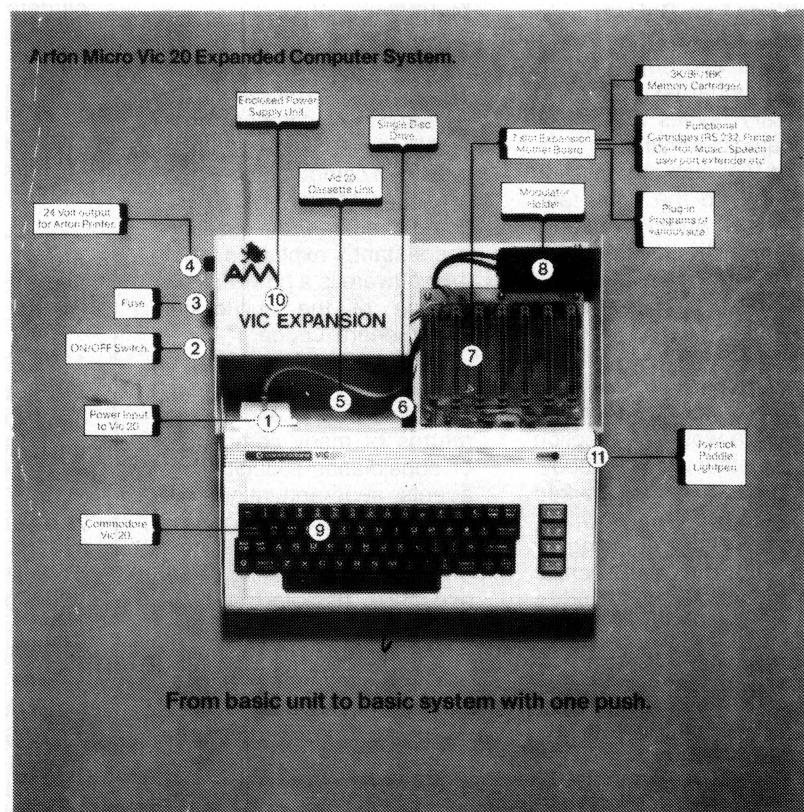
The cassette port and disc port are still totally usable as are the games paddles etc. Your modulator will now be held at the rear of the expansion board.

We have housed your new computer system including the Vic 20 itself in an aluminium shell. The front of the housing follows the contour of your Vic 20 while the rear is raised to give protection to your cartridges.

As an option we offer an aluminium cover to give greater security and protection, at the same time providing a base for your television. Educational users will no doubt secure this cover to the main shell preventing the removal of cartridges.

The power pack has an extra 24 volt rail and socket at the side of the shell that will power the new Arfon Micro Printer which is being especially designed for our Vic 20 range.

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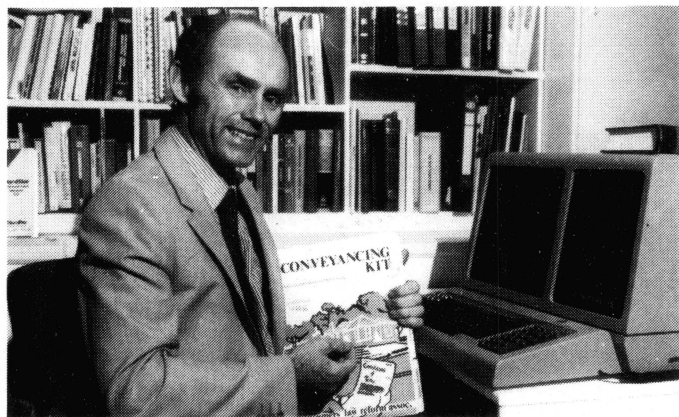
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Archives Law Reform
COMMUNICATION with members and supporters is one of the hardest chores for voluntary bodies with small, dedicated committee.

One Victorian organisation has grasped the nettle and installed an Archives computer to take the hack physical work of its committee, and give it the ability to resume work on its original objectives.

Until recently the Consumer's Law Reform Association of Victoria was no exception to every other voluntary body, and the committee worked long hours at the typewriter, and at collating, binding or enveloping as an essential chore to keep the body's aims and ideals burning.

Their burden was further increased by the need to regularly update the Association's Conveyancing Kit, which is sold through newspapers and bookstores.

The Consumer's Law Reform Association was formed in 1977 to bring about changes in laws that unduly exploited consumers and, particularly those that inhibited commercial competition for the benefit of small sections of the community.

Chief amongst the Association's initial objectives was the reduction in home buyer's conveyancing costs, which, according to President Mr Dale Sedgeman, currently add an average \$616 to the cost of selling or buying a house. □

Multi-Company Accounting
SYDNEY software company The Automated Office has released a multi-company general ledger software package for CP/M computers.

Michael Morton, TAO managing director and a qualified accountant, explained that the software is a powerful extension of the successful TAO General Ledger.

The package is designed for organisations which manage the accounts and annual returns of many companies or subsidiaries including tax agents, superannuation brokers, professional accountants and public trustees.

Apart from operating on inexpensive desk-top computers the package offers many attractive features including full integration with word processing for preparing annual returns, automatic accrual reversals, standing journals, account reclassifications and management reports.

Single copies are priced at \$1500 including a comprehensive 100-page manual. Detailed information may be obtained by contacting Michael Morton on (02) 411-1892. □

Winchester Controller
WESTERN Digital's WD1000 Winchester Controller has made its Australian debut after a highly successful launch in the USA.

The WD1000 is a stand-alone, general purpose Winchester Controller, designed

to interface up to four Winchester drives to a host processor.

The drive signals are based upon the floppy look-alike made popular by Shugart's SA1000, Seagate's ST506 and other drives from Quantum, Tandon and MPI.

Communications to and from the host computer are made via a separate computer access port. This port consists mainly of an eight-bit bi-directional bus and appropriate control signals.

All data to be written to or read from the disk, status indication, and macro commands are transferred via this eight-bit bus. An on board sector buffer allows data transfers to the host computer independent of the

actual data transfer rate of the drive.

The WD1000 has been selected for use in major new systems coming from Tandy Corporation and TeleVideo Systems.

The design-ins represent current and potential orders for as many as 10,000 controllers, according to Chester Brown, director of marketing for Western Digital's Components Group.

"Tandy and TeleVideo are major forces in the small computer marketplace, so it's particularly gratifying to be chosen for their new hard-disk systems", Brown commented.

For further information contact: PO Box 114, Sandringham, Victoria, 3191. □

Top 30 Apple Programs — May 1982

			Position Last Month
1	Star Blazer	Broderbund	7
2	Apple Cillin II	XPS Inc	4
3	Lemmings	Sirius	- *
4	Jellyfish	Sirius	- *
5	Minotaur	Sirius	- *
6	Visicalc 3.3	Personal Software	1
7	D.B. Master	Stoneware	-
8	Kabul Spy	Sirius	- *
9	PFS	Software Pub. Corp.	3
10	Dos Boss	Beagle Bros	26
11	Audex	Sirius	— *
12	Foosball	Sirius	25
13	Timezone	Online	6
14	Wizardry	Sirtech	5
15	General Manager	Online	13
16	Apple Panic	Broderbund	-
17	Utility City	Beagle Bros	10
18	Master Type	Lightening	8
19	Typing Tutor	Microsoft	25
20	PFS Report	Software Pub.	-
21	Alpha Plot	Beagle Bros	-
22	Olympic Decathlon	Microsoft	17
23	Versaform	Applied Software	- *
24	Microsoft Tasc	Microsoft	29
25	D. Midnight Magic	Broderbund	2
26	Visitrend/plot	Personal Software	-
27	DB Master (H Dsk)	Stoneware	- *
28	Apple Speller	Sensible Software	-
29	Hadron	Sirius	-
30	DB Master Utilites	Stoneware	23

*New Program.

(Prepared By Imagineering)

A successful sandwich shop means more than cutting great sandwiches. It means cutting costs to the bone without cutting corners.

The NEC PC8000 personal computer makes it possible for the small businessman with no computer training, to analyse his business in every aspect.

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The NEC PC8000 personal computer is designed and manufactured by NEC in Japan, where 10,000 a month are being manufactured and sold worldwide.

★★★★★

Application programs available include:-

2 Word Processors, Mailing List, Telecommunications, Target Business Planner, Debtors, Creditors, General Ledger, Inventory, Invoicing, Program Generator, Dbase II, Micro Modeller.

NEC
TOKYO JAPAN
PC 8000 series

“WHEN IT COMES TO CUTTING COSTS THIS COMPUTER IS AS KEEN AS HIS FAVOURITE KNIFE.”



First Local Test: A Closer Look At The IBM



While many people view IBM as the stereotypical corporate giant, where the machines dominate the people, its new entry into the personal computer industry shows the times are a-changing...

BEFORE IBM announced its new personal computer, rumours had been flying around the industry for some time that a machine was in the offing. Industry observers even remarked that other manufacturers were withholding their own announcements until IBM had revealed all.

In the event, when the mainframe industry leader did show the new machine, people weren't exactly relieved, but at least it didn't seem to be as bad as they had expected. Many were surprised at the adoption of an 'industry standard' microprocessor, the 8088, and an 'industry standard' language, Microsoft BASIC. Indeed, the whole machine did not seem to have been cast in the IBM mold.

However, it has sold well; apparently better than IBM expected, for it seems to be having trouble in satisfying the demand. There can be little doubt sales of other comparable machines have suffered as a result. And other manufacturers have set about to follow IBM's lead, most notably in Japan.

On the whole, though, everyone seems happy enough about the IBM machine. Many other manufacturers take the view that IBM's announcement has 'legitimised' the personal computer: it's now possible to have one on your desk without being labelled a crank. To some extent this would have happened anyway, as the industry matured, but it seems IBM has paved the way.

What's the machine like, anyway? With a little help from Don Weir, of Customized Technology in Sydney, we were able to have a close look at the machine he brought in to do software development.

The IBM consists of a main cabinet, called the system box, with a separate keyboard and video monitor. The system box is quite small, not much bigger than an Apple, but is heavy, being built from cast components for the most part. Likewise, the keyboard is surprisingly heavy; there is no likelihood of this sliding around your desktop.

The front of the beige system box is either blank or contains one or two 13cm disk drives — the model we examined had one disk drive. At the back of the machine is the keyboard connector (DIN type), video connector and blank panels for extra boards such as the communications card and colour video card.

There's also an IEC connector and fuse for 110V power — we ran the machine on

an auto-transformer without any problems, though of course when the machine is released here it will run on 240V.

Superb Keyboard

The keyboard is superb, with a positive feel and a clean uncluttered layout. The key clicks as it goes down in a very similar way to an IBM typewriter key, although the mechanism is very different.

At the left of the keyboard is a set of ten user-definable function keys, and on the right end of the main area is a combined numeric/cursor control pad.

Also on the keyboard are special functions keys for case lock, scroll lock, and so on. The only slight problem encountered was with the small size and inconspicuous positioning of the carriage return key, but a regular user wouldn't be worried.

The video display can sit on top of the system box. In our case, we used a standard Sanyo monitor, which worked fine. Don also had a colour video card in the system, but we used a monochrome (green) screen, and didn't have a look at the colour.

There is a thumping great (easy to find) on/off switch at the right rear of the machine. Inserting a disk and switching on will boot the system, performing a self-diagnostic test and then loading PC-DOS.

If no disk is in place the system will, after a short delay, decide it should just run

cassette BASIC and sign on with the appropriate message.

Sounds Familiar . . .

When the DOS loads, it asks the user or the date, and then displays the system prompt, A> (sound familiar?). PC-DOS is CP/M-like in some ways, and rather different in others. For example, typing DIR will list files on the disk, but in a single-column format with file size and creation/update date, unlike CP/Ms four-across straight directory listing.

A number of utilities are provided for such jobs as formatting and copying disks, copying files, and so on. A curious program to find on the disk was a linker — without an assembler it's difficult to write linkable code. One can only presume IBM intends to supply some programs as linkable modules, allowing the user to combine them as required.

The major piece of software the new owner will use is the BASIC interpreter. This is broadly similar to Microsoft BASIC-80 version 5, although there are some syntactical differences, primarily in the way files are opened. Otherwise, it's close enough to MBASIC 5.2 to make translation a trivial task.

In fact, there are three versions of the BASIC interpreter. Cassette BASIC is permanently ROM-resident in the machine, and forms the nucleus for the other versions. Disk BASIC contains file-handling and other extensions, while the extended BASIC, BASICA, contains further high-resolution colour graphics and music-playing extensions.

In particular, the extended BASIC includes two different macro languages for graphics and music manipulation.

Excellent Graphics

The DRAW command expects a string as its argument, which contains a sequence of commands to move a 'pen' up, down, left, right, diagonally or to absolute or relative coordinates. Further prefixes instruct the pen to move but not plot, move and return to the starting point, set angle, set colour, set scale factor and even 'GOSUB' to execute a substring.

Using this macro language, it is possible to draw graphics extremely rapidly, and the string-handling functions of the language could conceivably be used to operate on shapes. Having drawn an outline, it can be filled in with the PAINT command (which is fascinating to watch).

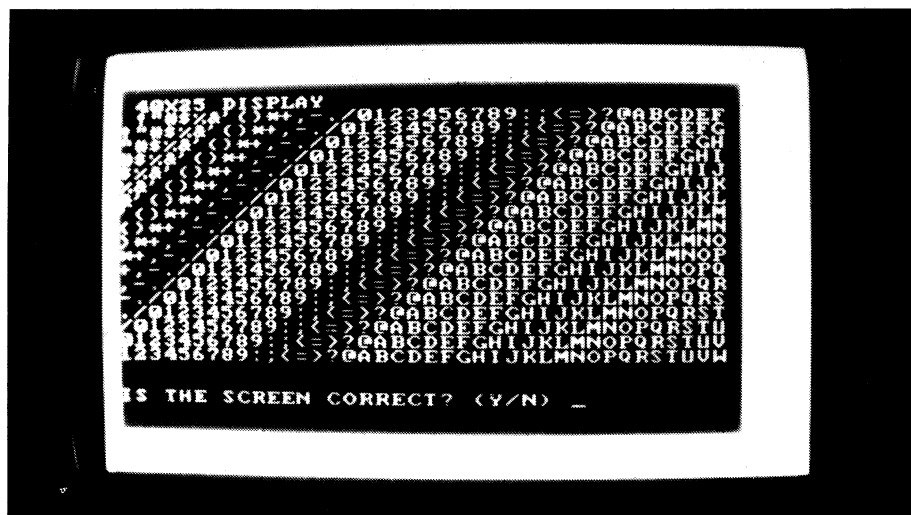
The high resolution graphics are superb.

The music macro language works in a similar way, PLAYing strings of notes, rests and timing commands. A particularly interesting facility is the ability to play a tune in background mode, while the program continues to execute!

Specifications and Report Card

Unit:	IBM Personal Computer
Made By:	International Business Machines Corp.
Processor:	Intel 8088
Clock Speed:	4.77 MHz
RAM:	16 Kbytes min, 256 k max, 64 Kbytes typ.
ROM:	Bootstrap and self-test
I/O:	Serial comms and parallel printer i/f
Languages:	BASIC, Pascal, others under CP/M-86
Keyboard:	QWERTY nice, with cursor/numeric pad
Display:	40 × 24, 80 × 24 software selectable
Graphics:	320 × 200, 16 colours
Peripherals:	160 Kbytes/floppy disk
Expansion:	Internal RAM, hard disk controllers and others
Best Points:	IBM, 16-bitter
Worst Points:	Slow BASIC, not yet available in Oz

Ratings:	excellent	very good	good	poor
Documentation:	✓			
Ease of Use:		✓		
Functionality	✓			
Support:		✓		
Value-for-money:		✓		
Extras Included:	1 floppy, colour graphics			
Options:	N/A			
Price:	N/A			
Review Unit from:	Customized Technology			



Other functions include special communications commands which allow the user to access the interrupt-driven communications ports through BASIC, binary load and save commands, and DATE\$ and TIME\$ predeclared variables.

The graphics and music statements are shown to good effect in some of the demonstration programs, which play music and show the notes on a piano keyboard. The speed of operation of the graphics and concurrent music is reminiscent of assembly language code, rather than BASIC.

While many of these new statements are provided courtesy of the powerful 8088 16-bit microprocessor, its power has not been extended to the rest of the BASIC interpreter, and this is the most disappointing facet of the IBM.

Frankly, the major part of the BASIC interpreter seems to be warmed-over 8080 code which has been passed through Intel's CONV-86 program and not optimised for the 8088 at all (CONV-86 is a program which can convert 8080 assembly language into 8086/88 source code — though never particularly efficiently).

Our benchmark tests confirmed this. Editor Bell's dear old 1977 vintage 2 MHz 8080 completed a prime number benchmark in 2m 54.31s, while the IBM could manage only 1m 50.61s — a 57 percent improvement.

In other words, the IBM's 8088, running at 4.77 MHz, is roughly equivalent to a Z-80 running at 3 MHz.

This is confirmed by comparison with

Table 1 — Benchmark Timings

a) generate prime numbers from 1 to 1000

IBM PC:	1 min 50.61 sec
2 MHz 8080:	2 min 54.31 sec
6 MHz Z-80B:	45.7sec

b) Write word "test" to disk 3000 times

IBM PC:	26.95 sec
2 MGz 8080 and Morrow:	35.89 sec
Discus controller	
6 MHz Z-80B and Godbout:	12.5 sec
Disk 1 DMA Controller	

the time for a Godbout system with a 6 MHz Z-80B to run the same program — 45.7s. Comparisons of disk speed show similar results.

We have seen other benchmarks, using assembly language, which show the kind of difference between the 8088 and Z-80 that one would expect between a 16-bit and an 8-bit processor — that the 8088 is much faster. Consequently, the only conclusion one can arrive at is that Microsoft's 8088 code is dragging the 8088 down.

Rumours abound of a new version of MBASIC to be released for the IBM, this time properly written for the 8088, and with a vast speed improvement. However, since Cassette BASIC is in ROM, this virtually makes it a hardware upgrade of which many users will never take advantage.

Just goes to show what a lousy guide to performance clock speed and word length can be, when working with a high-level language. And of course, the IBM con-

tains an empty socket for an 8087 Arithmetic Co-Processor chip, which will provide a vast improvement in number-crunching applications — for a price (the 8087 currently sells for around \$500!).

However, as Les never tires of saying (with a 2 MHz processor he has a vested interest), speed isn't everything. On ease of use and friendliness, the IBM rates highly. The manuals are excellent, a series of three loose-leaf boxed binders covering system operation, BASIC and DOS.

All three are very well written indeed, actually better than Apple's high standards. There's a certain traditional IBM style in evidence though, particularly in acronymic chapter headings like 'PDPs', which apparently stands for 'Problem Determination Procedures', but could have been more adequately and simply expressed as 'Troubleshooting'.

A huge amount of software is starting to appear for the IBM, with the release of such old favourites as WordStar, CP/M-86 and so on.

The new CP/M-86 release is particularly interesting, as it is the first appearance of Concurrent CP/M, a version which supports multi-tasking for a single user (print invoices in the background while playing games in the foreground!).

Overall, then, the IBM Personal Computer offers a well-designed package with a number of unique and powerful features. Microsoft's BASIC rather lets it down in the speed department, but its other features and the IBM support make up for that. □

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Toshiba Tryout



Many small business owners are looking for a fairly basic computer to handle very simple accounting functions — nothing fancy, just a good, solid reliable machine: the kind of thing computer hobbyists would scorn. Toshiba is set to take its fair share of that market with the T-200, reports Les Bell...

AS A 'lapsed' computer hobbyist, I still feel a fascination for gee-whizz machines with colour graphics, sound effects, and all kinds of plug-ins. From that kind of viewpoint Toshiba's T-200 just wouldn't score at all. Nothing. A duller machine is hard to imagine.

Fortunately, the businessman doesn't look at computers from that point of view; for him, the T-200 has some very good points indeed. It's a solid machine with a pleasing and easy-to-use screen and keyboard.

The T-200 basically consists of a main enclosure which holds the CPU, screen, one or two disk drives and the other bits and pieces which go to make up a computer. The keyboard is a separate unit, which is attached via a cable to the rear of the machine.

On lifting it out of the box, I was struck by two things; first its weight (it really is solidly built), and second, by the cables

which protruded from the rear of the machine.

Unlike most machines, there is no connector panel at the rear: the cables just run straight out of the machine through some grommets. I guess this reduces the possibility of cabling errors — it also means no extra cables are required with the T-200, a common trap for the unwary who then have to spend a small fortune on cables.

The two minifloppies on our review machine were mounted beside the screen, above the power indicator and brightness control for the screen. At the rear are the cable outlets, AC cord and a fan grille — nothing complex at all. Our machine had a mysterious third cable apart from the keyboard and printer cables.

After plugging in the keyboard and printer, we switched on and lo and behold! the machine worked first time. We booted up the CP/M operating system and everything was there and working.

Inside the machine is fairly standard. The processor is probably a Z-80 or 8085 running at a reasonable clock speed, and there's 64K of RAM in the box. These details are comparatively unimportant for the business user, and are likely to be significant to software developers.

The standard software for the machine includes a standalone implementation of Microsoft BASIC. This constitutes both the operating system and the language, and it is a system that has been used with

some success by other Japanese manufacturers. However, most, including Toshiba, are now concentrating on CP/M as the primary operating system.

The standalone BASIC seems to be very similar to MBASIC 5.2, with major differences in the area of file handling and I/O. The language comes with a package and utilities for indexed sequential file handling, which makes business applications a lot easier.

Other useful features include the ability to create turnkey disks which boot straight into the application program. This relieves the operator of having to key in the appropriate command line to set the program running.

Toshiba has accounting software for the machine written in this way, and it is very easy to use. We tried out the accounts receivable with invoicing. To start the program was a matter of inserting the system disk into drive A and booting the system. This then loads the BASIC and initial menu program; inserting the program disk into drive A will then load and run the debtors system.

Like most micro accounting packages, this one runs with program disk in drive A and data disk in drive B, and the first time the system is run, various control parameters must be entered to set up the data disk, — number of debtors, number of salesmen and so on.

The system has been well designed as far as operator entry is concerned, with the operator able to retain existing field

entries, over-write, cancel, and use the cursor controls to edit fields. This kind of editing facility makes data entry very easy.

The system provides a variety of reports, including a trial balance, overdue accounts, list of accounts which have exceeded credit limits, inactive accounts, account ledger, account sales, and name address, and telephone records.

Analyses of sales tax, transaction types, debtor groups, sales code dissection and salesman performance are also provided, as well as statements.

At the time we saw the package, the manual was still in preliminary form, and there were a few loose edges to tie up, but the package worked fine on the limited test drive we gave it.

For those operating under the CP/M operating system, the Toshiba also supports the Padmede business system. Written in the United Kingdom, this package has a few 'Englishisms' in its accounting terminology, such as references to the Nominal Ledger, but conforms to Australian accounting practices.

This package comprises invoicing, debtors, stock, creditors and general ledger programs.

In recent months, this system has acquired an excellent reputation. The documentation is of a very high standard, with examples, and the system is easy to use.

Some people are not keen on the heavily boxed and ruled displays which the system shows, but for a first time computer user, they probably look more reassuringly like forms than the more conventional computer screens.

Again, the system is menu driven, and uses a data disk in drive B. The general ledger is integrated with the other programs and all the programs produce a comprehensive range of reports.

Several other programs are available to run under CP/M on the T-200. For example, we first came across the T-200 when John F Rose demonstrated CalcStar to us on it, and it will also support WordStar and other products in Micropro's line.

In use, the keyboard felt good, with a logical layout. There are ten program-definable keys, and a couple of special function keys which are used by the Toshiba accounting programs. The screen display was easy on the eyes, though there was a slight drift on it, possibly caused by its proximity to another display.

The printer supplied with the system was a C. Itoh (I think) under the Toshiba banner. A fairly quick, rugged printer; like the computer, short on fancy features, but more than adequate to get the job done.

Our review sample of the Toshiba T-200 was supplied by Toshiba Australia of North Ryde. □

Specifications and Report Card

Unit:	Toshiba T-200 Very Small Business Computer
Made By:	Toshiba Corporation
Processor:	Z-80 (prob)
Clock Speed:	N/A
RAM:	64K
ROM:	bootstrap
I/O:	serial, parallel
Languages:	BASIC, CP/M languages
Keyboard:	QWERTY, fair feel, user-definable keys
Display:	80 × 24, good quality
Graphics:	what graphics
Peripherals:	printer
Expansion:	N/A
Best Points:	wordman-like machine, solid construction
Worst Points:	N/A

Ratings:	excellent	very good	good	poor
Documentation:			✓	
Ease of Use:			✓	
Functionality		✓		
Support:	✓			
Value-for-money:		✓		
Extras Included:	Accounting software			
Options:	N/A			
Review Unit from:	Toshiba			



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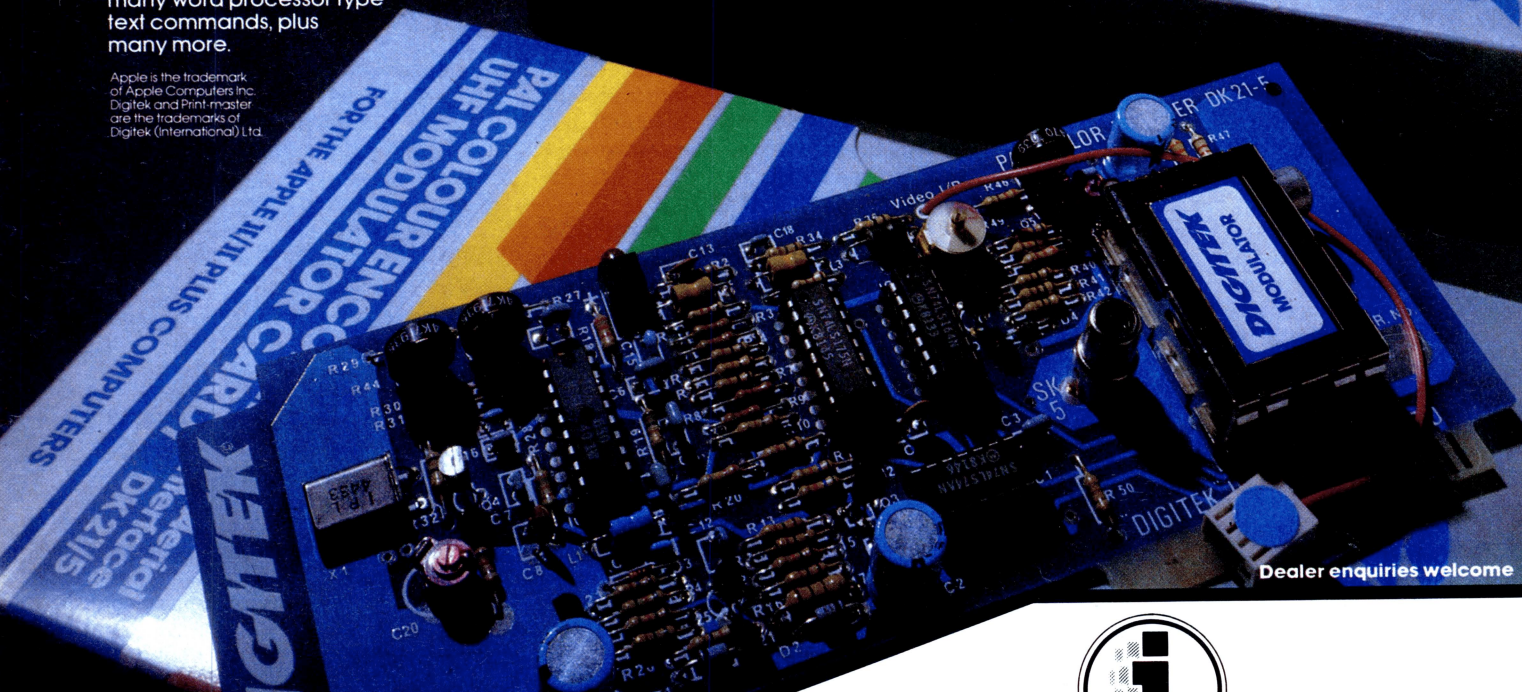
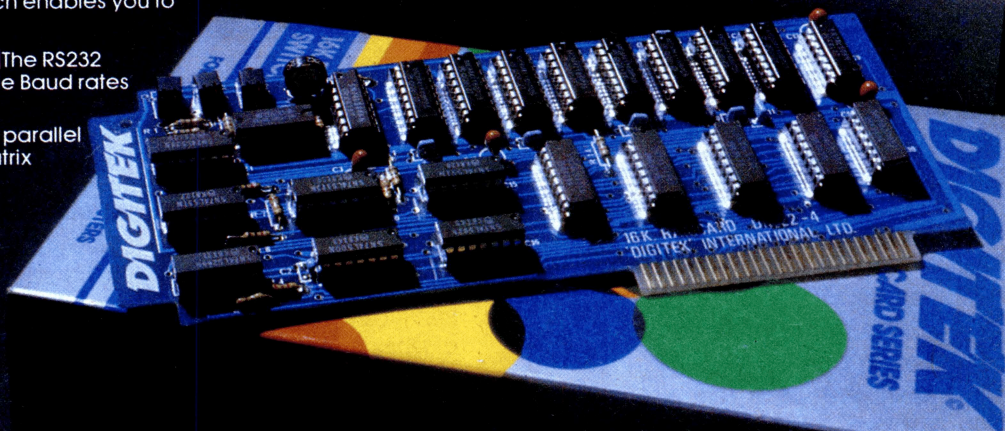
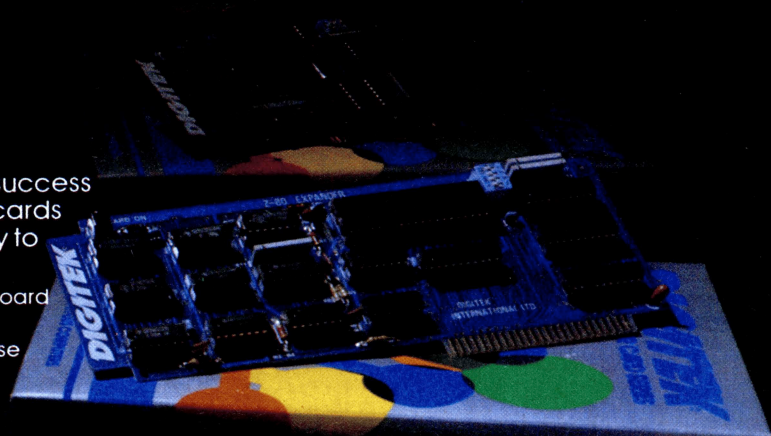
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Commodore's Silicon Office



The Electronic Office is the subject of much discussion amongst computer companies these days, but once you dig into it you find there's a lot of talk and not much action. LES BELL reports one small British company has made significant progress with its Silicon Office package for the Commodore.

THESE DAYS, with the amount of software on the market, it is pretty well possible to do away with paper in the office. On my own system, for example, I have word processing, accounting, financial modelling, mailing list and other programs, and scarcely need to touch a piece of paper.

The big problem with this is that every program works in a slightly different way. Some expect carriage returns after every command input, some accept single key commands and every one has its own unique flavour and style.

While that's acceptable to a computer buff like myself with a binary brain, most computers have to be operated by real people, for whom this is quite a challenge.

Consequently, a major improvement would be a single program that could perform most of the functions outlined above, with only one set of commands and one 'style' to learn.

The Silicon Office is just such a program. With the assistance of a Commodore 8096 computer, this package provides database, word processing and communications functions that work in a consistent and easily-learned way.

Like most commercial software, Silicon Office works with two disks: a program disk, in drive 0, and a data or work disk in drive 1. Data disks are different from work disks; the former contain structured data files such as database files, while work disks contain sequential files for such applications as word processing.

On power-up, Silicon Office is loaded by simply pushing the SHIFT and RUN/STOP keys. The system automatically loads and presents a date prompt. The operator then enters the date.

What Day Is It?

This brings me to the first of several interesting features of Silicon Office — its ability to calculate with dates.

Using the EV(aluate) command, the program can calculate days between dates and dates so many days before or after another date, with today's date simply being assigned the variable name TODAY. Best of all, dates are entered and manipulated in the form 12 May 82, not 12/05/82 or worst of all 05/12/82.

Once the date has been entered, Silicon Office is ready to accept commands. All commands are entered as two-letter

mnemonics, with optional arguments. Once the command is entered, and the CR key pressed, the line is redisplayed in its full form, and the CR key should be depressed again to execute the command.

For those, like me, who can never remember mnemonics until it's too late, the H(elp) command will display a help menu with references to the appropriate pages in the reference manual. This should be enough to jog the memory for, like many well-designed systems, Silicon Office has a simple and short series of commands.

Calculations are performed by the EV(aluate) command. For example, the line:

```
EV REVENUE = SALES QUANTITY *  
PRICE
```

will multiply sales quantity by price and store the result in memory location revenue. Arithmetic operators and functions include the usual stuff, as well as TAN, ATN, MAX, MIN, SGN and ABS.

The contents of memory are displayed with the DM (display memory) command. This produces a neatly formatted display of variable names and values, which will scroll if there aren't enough lines on the screen for the number of variables.

Values can also be input to memory locations using the IN(put) command. This will prompt the user and store the input value into memory.

Database Management

Silicon Office incorporates quite a sophisticated database management system. A new database file can be created quite easily using the F(ormat)R(ecord) [filename] command. This will set up the system, ready to accept a record definition.

This is simplicity itself, as SO contains a very nice screen handler. The user simply draws a form on the screen using the cursor control keys and a few other simple commands, and from the layout of the form, the system is able to work out field lengths and names.

Once the file has been created, records can be entered using the IR (insert record) command. This allows the user to fill in the form he/she has just created. Full editing is provided.

The system has the ability to perform arithmetic using values from the current record of the database, using the EV command in exactly the same way as before.

In addition, the database can be searched either by key field (the first field on the screen) or on any field. The user can also scan through the entries on numeric or alphabetic order.

Records can be edited using the AR (amend record) command, which recalls the specified record to the screen, where it can be edited using the cursor controls.

The commands used to drive Silicon Office manually can also be combined into programs. The EP (edit program) command allows the user to construct a table of command lines which can then be executed automatically using the GO command. Loops can also be set up using the GO command, as well as the conditional command IF.

Sequential accessing of files is done through the NR (next record) command which will step through the database.

Modular Programming

Programs can be saved on work disks, and as programs get larger and begin to exceed the allowable size, they can be broken up (good modular programming style) and chained together.

As well as numeric variables, SO can also use text (string) variables in a similar way to BASIC. These can be stored in calculator memory or database fields. The entire calculator memory can be stored to disk and later restored.

SO's word processor is quite sophisticated. It includes commands for justification, centering, underlining, headers, footers, find/replace, automatic date insertion, and other features that are usually only found in specialised word processors.

The word processor operates using similar commands to the rest of SO, but is a separate subsystem in which the more general SO commands will not work.

However, information from data files can be merged into documents for invoicing, direct mail shots and reports.

The print commands allow a considerable degree of latitude in setting up the print position and format. Printer control characters can also be embedded into documents for special effects such as superscripting or double width printing.

The system includes an extremely versatile report generator which uses some of the programming commands to perform totalling, subtotalling and other special facilities.

A major bonus in the package is the ability of the Silicon Office to communicate with other machines. The communications facility is very versatile, allowing the local operator to control the remote system and send disk files.

The overall impression I get of Silicon Office is that it is a versatile system indeed.

It is easy to use, and this is assisted by excellent documentation. There are two manuals, one tutorial in nature and the other a reference guide.

The reference manual includes information on transferring BASIC files into the system and other information for

sophisticated users.

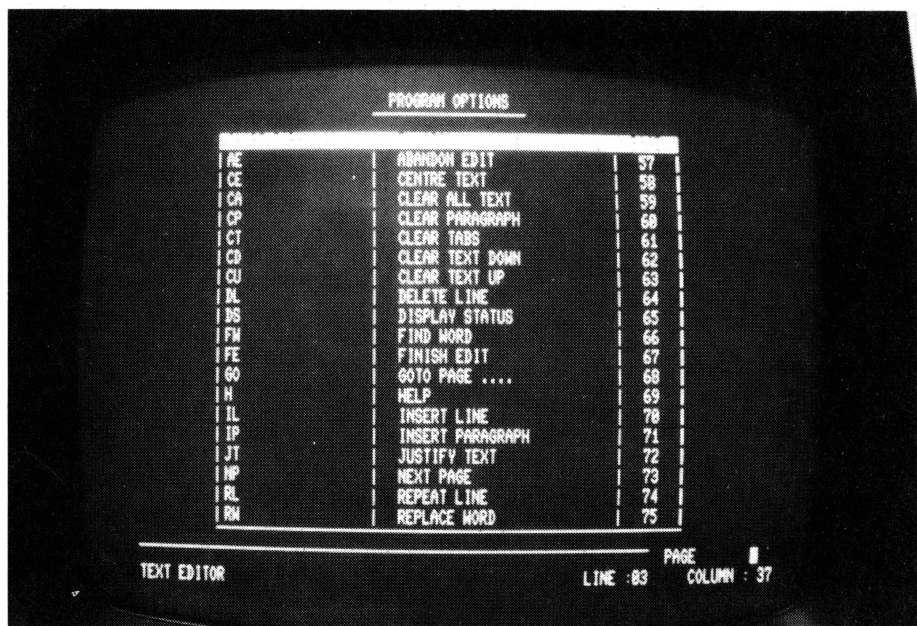
Both manuals are well written and organised, and were in fact edited and printed using Silicon Office itself.

Silicon Office runs on the Commodore CBM 8096 microcomputer. This has a full keyboard with numeric pad and a very good 80 column screen. A major plus of this machine is its 96 Kbytes of user RAM, in addition to 12K BASIC in ROM — without this much RAM, Silicon Office would never fit.

The matching disk drive has almost 600 Kbytes of storage per disk. This is connected through a GPIB (General Purpose Interface Bus) cable — unfortunately this is not as fast as a direct disk drive connection, so the disks were disappointingly slow. However, this was only a real worry when formatting a new diskette.

The overall construction of the 8096 is very good. It has a solid feel, and the keyboard had a good action. The matching printer also uses the GPIB interface, piggy-backing onto the disk connector.

The Silicon Office is a well thought out system. It is easy to use and to understand, and would work well for many small offices as well as departments of larger organisations. ☐



The Professional System 80...



Ever since Dick Smith first started selling his System-80 computer, he's been giving some other companies around town a hard time. Now he's set to do it in the business end of the market.

MOST OF our readers will be familiar with the Dick Smith System 80 computer; in fact, many will own one.

The 'hidden secret' of the System 80 is that it is software compatible with the Tandy TRS-80; this meant that when it first appeared it was not a software orphan, while since then a considerable amount of software has been written for the System 80 in its own right.

Since it first appeared the System 80 has undergone a number of revisions and updates; the latest, the System 80 Business Computer, has updated firmware and some hardware changes.

The main keyboard is a standard QWERTY type with a good feel and beside it is a numeric keypad and a set of four user-definable keys.

The keyboard will operate in two modes; in one, the keyboard operates in capitals unless the shift key is entered, in which case it shifts to lower case — good for BASIC programming — while in the other it functions like a conventional typewriter, which is better for word processing and similar applications.

At the rear of the machine are the video, cassette and expansion interface con-

nectors. The cassette which used to be built into the System 80 has been replaced by the numeric keypad on the Business Computer, but very few owners would use cassettes anyway. Disks are essential for business applications.

The expansion unit contains sockets for an extra 32K of memory as well as a parallel printer interface and the floppy disk controller circuitry. Also available are an optional S-100 bus interface and an optional RS-232C interface.

Interestingly, the printer interface is mapped to either memory address 37E8H (a la Tandy) or I/O port FDH, and either one can be used.

The S-100 interface is claimed to allow memory expansion beyond 48K by using memory boards with bank select facility. A caveat may be in order here — the S-100 adapter is connected via a 50-pin connector, yet it has 100 lines, nearly all of which are utilised in the IEEE specification for the S-100 bus. How then can the expander be S-100?

To match the system, Dick supplies some neat MPI 40 track 13cm disk drives. There are two different types, depending upon whether the drive is at the end of the connecting cable or not (the last drive must have termination resistors for the cable).

With our review system, we ran a TEC F10-40 daisy wheel printer. This is a 40 character per second typewriter quality printer, with a full range of daisy wheel features, such as superscripting and sub-

scripting, double striking, and so on.

To complete the ensemble, a matching green phosphor or black-and-white monitor tops the computer.

With the expansion box plugged in, the system boots the disk on power up. The recommended operating system for BASIC program developers is NEWDOS/80 Mark II, an extremely sophisticated piece of software indeed.

However, for the basic business applications, no DOS is needed, as the applications programs boot themselves off disk automatically, using the MicroDOS operating system.

SCAPs Off To Dick

SCAP stands for Stock Control and Pricing system, and is a quite sophisticated program which meets the needs of small to medium size companies by managing up to 1200 stock lines.

The system can provide a number of reports, including price lists and stock status lists. These reports may be for all items in stock or selected by number, by supplier, by status (out of stock, below minimum, on order, and so on). Reports can include month-to-date and year-to-date sales figures.

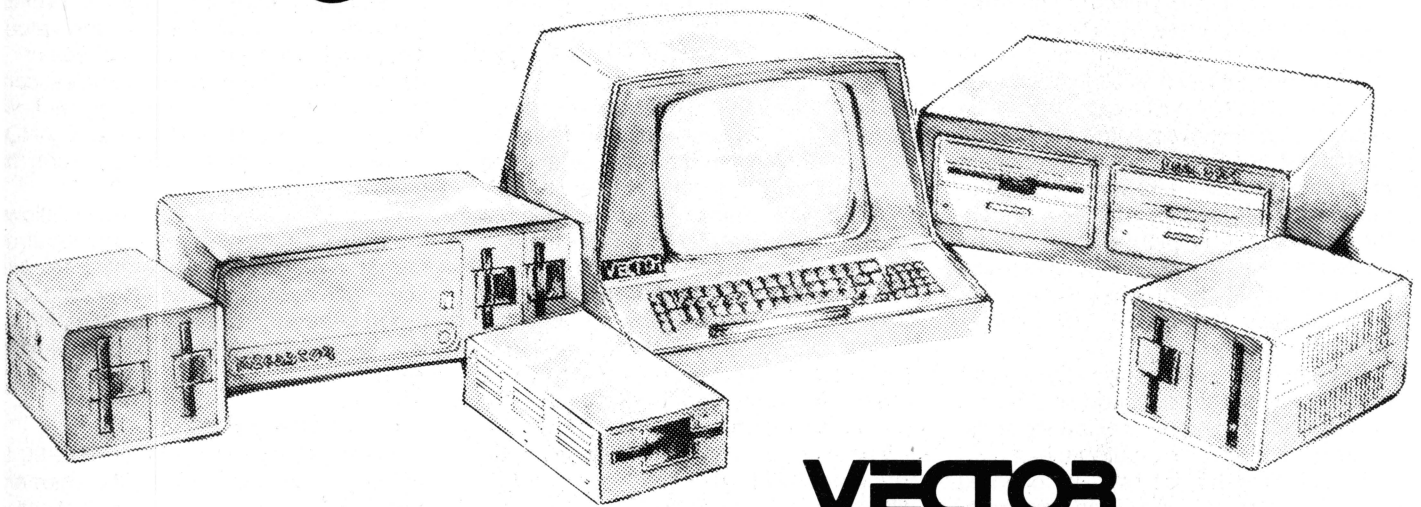
Interactive examination of stock levels is possible, as well as updating of records. Other menu items on the main menu include: new item entry, enter sales dockets, post sales dockets, enter goods received, enter orders placed, stock status sum-

Continued on page 112

JUNE SALE

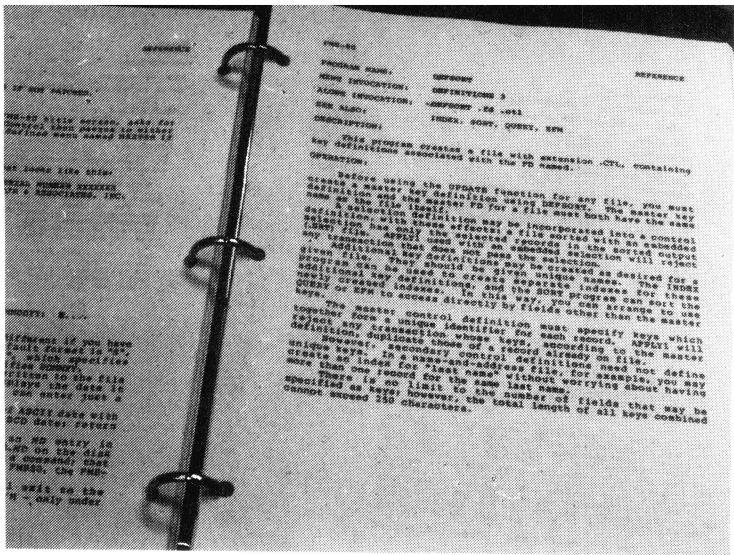
- VECTOR 1600
64K RAM - 630K on 1 drive
- VECTOR 2600
64K RAM - 1.26MB on 2 drives
- VECTOR 3005
64K RAM - 5.63MB on 1 Hard disk and 1 floppy disk
- VECTOR 3032
64K RAM - 32MB on 1 Hard disk and 1 floppy disk
- VECTOR 5005
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Manage Those Files— with FMS-80

Continuing his examination of database management systems, Les Bell this month looks at FMS-80.

LAST ISSUE I took a look at Ashton-Tate's dBase II, an assembly language relational database management program. This month's subject is a rather more sophisticated package, one which is somewhat more intimidating to the first-time user.

FMS-80 is not billed as a database management system, even though that's what it really is. The FMS stands for File Management System, and FMS-80 is actually a set of programs which chain to each other to perform various tasks.

FMS-80 is totally menu-driven, unlike dBase, which requires the user to know the commands and type them in on a command line. Once FMS has been invoked, and the user has typed in the date, the system presents the user with a main menu, from which subsidiary sections can be selected.

Installation

As supplied, FMS-80 has to be customised for the user's system. Such customisation allows setting up of terminal parameters, done by selection of a terminal driver parameter file (or creation of a new one), as well as allocation of the disk drive data files will reside on and the various titles displayed by the system.

This last feature is especially important for systems houses and application programmers implementing a turn-key system for a client, as the client's name can be embedded into the system. Another nice feature is the ability to select one of three different date formats — US, international, or year first.

Several other options allow the system developer to set single or double spacing, disable operator intervention during sorts, printer widths and other parameters.

In fact, FMS-80 seems to be oriented towards system integrators and programmers rather than end-users, although the documentation claims it is intended for non-programmers (and it's certainly easy enough to use).

A thoughtful example of this is the provi-

sion for adding a help facility to the application through a help message file and generator. Using this, the programmer can supply the user with help messages at any point in the operation of his program.

The main menu allows the user to choose between file definition, file maintenance, file reports, utility, help, batch operation, a user menu and exiting the system. Usually, the user will first want to set up a file definition.

The FMS-80 definitions editor allows the user to name each field in a record, set its type, length and picture (similar to COBOL's picture, or BASIC formatting with PRINT USING).

As each field is entered, the file structure is displayed at the top of the screen, with the field being worked on in the middle of the screen and a menu of commands at the bottom.

Once the file definition is complete, one can quit back to the main menu. Normally, after entering a file definition, one must then enter a control definition, which specifies the key fields for sorts and indexes. A control definition can also contain a select definition, allowing sorts and selects to be combined.

Once the major and minor keys have been defined, and ascending or descending order specified, data can be entered into the file. This is done through the UPDATE option, which is selection number one on the FILE MAINTENANCE menu.

When this selection is chosen, FMS-80 will execute a submit batch file called UPDATE.SUB. This is supplied with the system, but system developers (or users) can replace the supplied version with a customised one, allowing faster or more convenient operation.

The use of submit files is common throughout FMS-80. The shell program which actually runs FMS-80 is rather like a souped-up version of SUBMIT.

UPDATE.SUB will firstly load and run TRANSACT.COM, which will input a batch of transactions, then a sort program sorts them into order and optionally prints

them before APPLY1 is invoked, applying them to the database. The final stage of the process is the creation of a new index file for the database.

The APPLY1 program will check transactions before applying them to the database, and will reject 'add' transactions if they have keys matching existing records, or 'change' or 'delete' transactions if they do not match existing records.

This batch-oriented operation is quite different to dBase II, which operates directly on the database. However, FMS-80 does have a direct query/update facility, which allows the user to directly access a file. This method of access does not provide any record of changes as does the batch update.

Once a file has been created, the next step is to use it to produce reports. The easiest way to do that is through the PRINT FILE choice on the reports menu. Without any selection criteria, this will simply print the whole file, in a columnar format.

Selection criteria are placed in a selection definition, which specifies the values which are used for conditional selection for each field, together with a logical connector (AND or OR). By using multiple selection criteria, linked together by ANDs and ORs, very complex selects can be built up.

The FMS-80 report generator allows the user to create reports in any required format, automatically performing calculations such as subtotals and averages. The report generator is quite sophisticated, allowing considerable flexibility of layout and titling.

The Important Part

The most important part of FMS-80 is EFM, the Extended File Management language. This is a sophisticated structured language with the flavour of C, and which is compiled, not interpreted as is the case with dBase's language.

Programs are compiled with the command 'PREPARE filename', and ex-

ecuted with the command 'DO filename'.

The basic principle of EFM is that a program which opens one or more files for input will automatically loop, reading the first input file until it reaches the end of the file. Thus looping constructs are unnecessary, at one level, at least.

So a program can be written as though it only had to perform a transaction on the first record of a file, and it will automatically loop, performing the transaction on each record until it reaches the end of the file.

EFM's input and output statements allow any field to be read or written as required, with full consistency of type, record length, and so on.

Instead of using memory variables for calculations and temporary storage, EFM uses temporary fields, which must be declared at the beginning of the program.

EFM's statements include cursor movement, display, screen clear, data entry with optional upper case conversion, conditional statements and the dreaded goto. Subroutines are possible, and there is a switch or case statement to allow easy selection of multiple conditions.

EFM allows groups of fields to be referenced with one instruction, saving a lot of code writing.

The problem with EFM is that it is deceptively simple; there doesn't seem to be much to the language, until you start looking at the examples given in the manual, and realise that you must have missed something on your first skim through.

Any of CP/M's (or MP/M's) functions are accessible from within the FMS-80 shell. The shell behaves rather like CP/M's submit facility, by running a batch of programs in sequence, but it also will run a 'base program' when the list of programs is empty. Usually, the base program provides the user with a menu.

The shell also supports redirectable I/O a la UNIX. One gets the distinct impression that chunks of FMS-80 were written in C, or by a programmer with a predilection for C and UNIX. Several shell commands can be executed from within any EFM or assembly language or C program, sometimes with startling effects.

For example, shell function seven, 'Execute Command Immediately', causes the entire contents of memory to be written to a temporary disk file, and a CP/M command line to be executed. Upon completion of the called program, the memory image is restored, and control is returned to the calling program. The manual makes the point that this process is 'excruciatingly slow' on 13cm disks!

The Good Book

The documentation is very thorough; the manual starts with an introduction to CP/M, explaining how CP/M's command line works. From there on, it is primarily tutorial in nature, with a reference section

in the second half of the manual.

For a system as complex as this, no manual is complete, and the user will have to learn primarily by trial and error. The FMS-80 manual assists this process with good examples.

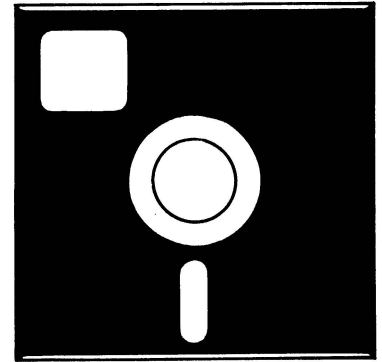
Overall, FMS-80 seems to be a sophisticated package indeed. Its programming language is supportive of structured programming techniques, and being compiled, runs pretty fast.

To compare dBase II and FMS-80, one would have to say that both are top-line programs, which can do a lot for any small or medium-sized business.

dBase II is probably better in a more interactive environment, perhaps where an owner-operator wants to generate lots of different reports, and doesn't mind learning by trial and error.

FMS-80, on the other hand, is probably more suited to fixed applications where only standard reports are needed and data entry is by inexperienced operators. FMS-80 seems to be particularly suited to

your computer



SOFTWARE REVIEW

software houses and developers.

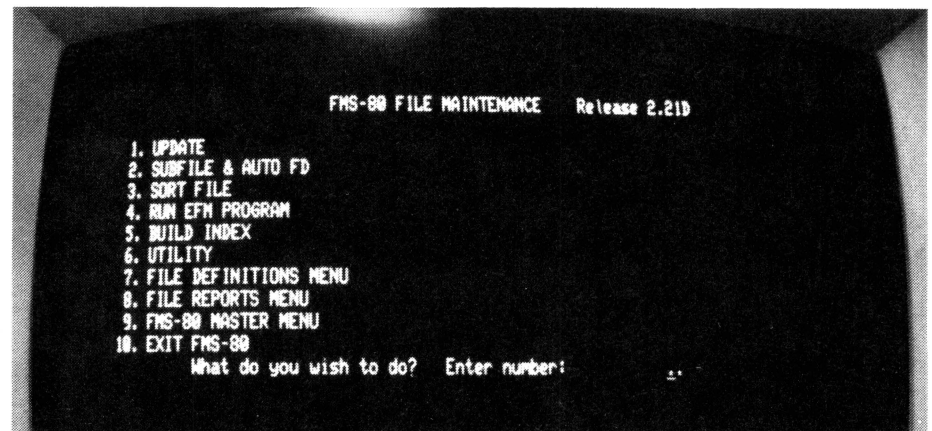
Our thanks to Monty Jaboor, of Cycom Systems in Melbourne, who loaned us copies of both dBase II and FMS-80 to make this evaluation. □

Software Report Card

Program:	FMS-80 File Management System
Made By:	DJR Associates
Useful for:	Database management, accounting, list management
Hardware Req'd:	8080/Z-80 running CP/M

Ratings:	excellent	very good	good	poor
Documentation		✓		
Ease of Use		✓		
Speed		✓		
Functionality	✓			
Support		✓		
Value-for-money		✓		

Review copy from: Cycom Computer Systems, 178 High Street, Windsor, Vic 3181



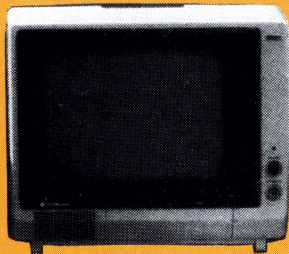
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HEARD ON THE BUS

By LEON YENDOR

IN THE very first column I wrote for *Your Computer* I discussed bus standards and pointed out how manufacturers who devised their own unique interconnect systems could be trying more to prevent their customers buying competitive add-ins than to devise a superior system.

I have just received details from one user of such a system on just how expensive a 'cheap' machine can be.

He works for a government organisation with a limited budget for computers and was effectively forced to purchase a rather basic personal computer to handle calculations required for some experimental work.

I won't mention the brand, but you've heard of it and I must admit that if its minimum configuration is suitable for your application then it is reasonable value.

The problem for this user is the experiment has proven worthy of further development — and in need of more computing power and much more storage capacity.

To add this requires the purchase of a Winchester disk and he has found, to his horror, that a 10 megabyte unit made by (or rather for) the original manufacturer costs just a few dollars less than an S-100 (IEEE 696) system with three times the processor speed, 64K of low-power static memory, two double-density double-sided 20cm drives and a 20 megabyte Winchester.

He'll have to spend more to add a terminal, of course, and his coffee breaks won't be enlivened with games in living colour, but neither will he be locked-in again.

As he says, "You told me so!", but he isn't alone and to some extent there is the excuse that no one could foresee the increase in requirements.

The lesson for the rest of us is really that we should not be buying a machine which barely handles our present needs. This is true at all levels. A microcontroller in a machine is not suitable if every trick in the book must be used to handle the task when the design is specified, and it is just as crazy to buy the world's best minicomputer if next year a mainframe will be needed.

You may think that I am trying to generate a higher expenditure on equipment



but if you examine the case history above you'll find that what this is really about is spending less overall.

More to the point is that the above case refers to the expenditure of our taxes and we need to get better value than we did in the example quoted.

Better Than Guessing

Guessing your future needs and buying to suit that guess is great if your guess is right and a disaster if your guess is way off, so you need to have a way of making better forecasts, right?

Wrong! What you really need is a way of ensuring that growing beyond your present equipment will not be too traumatic. If you follow the above advice you should not run into hardware limits before your computer has given you a reasonable return. The problem you then face at upgrade time is the software transplant shock.

If you write (or have written for you) your own code the way to reduce the cost of transporting your programs to a new machine is to make sure that they are written in a portable standard language and preferably are supported by an operating system which hides the hardware differences.

This means forgetting some of the most popular languages like Basic and Pascal. The standard versions of both of these are too restrictive to be of any use to anyone

to whom the cost of portability is significant.

It also allows the use of some which are of great sentimental value to their adherents, although I could never advise their use by those who don't already use them. (for example Fortran IV and Cobol).

The main thing is to be sure that you won't have to change the method by which you (or other users of your system) interact with the program and, where you don't own the source code, it might not hurt to ask the author or vendor what plans he has to support new machines which may be necessary for your operations in the future.

A little more buyer pressure may force some appropriate consideration of these problems by applications packagers. The smart ones do it already to maximise their own returns but at present the end-user has very little indication of whether or not this is true for most pre-written code.

Bigger Is Better?

About the time this appears in print I'll be deep in the heart of Texas at the National Computer Conference. Once the show for the biggies only, it now features micros on the same floor as the mainframes and minis.

Maybe it is just as well that this trend started a few years ago or IBM might not have been able to display its PC. Having left the mainframe world several years ago myself I'll find it interesting to see how it handles the transition, especially when the first time it shows the 5150 is in the one state famous for its love of the biggest of everything. Does this imply Big Blue is only aiming to have the biggest micro in the world?

Other attendees from this area are warned not to miss my paper on How to Avoid the Forthcoming Silicon Shortage (or how the oil sheiks plan to continue to be rich by monopolising sand when the oil runs out).

As the conference starts at about the same time as we go to press for July look for a report in the August issue. There are sure to be lots of new toys on show and I hope to be able to report on the real ones as well as the prototypes trotted out to scare the opposition. □

Reflections On A Reflections On A Mirror Mirror



As the race continues to see who can get a computer with graphics on the market for under \$20, Victorian company Mirror Systems has taken a step forward with its new machine, the Mirror 2000. LES BELL reports...

ONLY THIS morning I was idly wondering why it is that mirrors reflect from left to right, but not top to bottom.

You may have noticed that if you put a glove on your right hand, your mirror image has a glove on his left. But with shoes on your feet, your mirror image won't have his shoes on his head. Curious. Answers please, on a postcard, to...

The Mirror 2000 computer does not have any of these curious properties — thank goodness! Made by Mirror Systems, of Belmont, Victoria, the Mirror is a small 6502-based computer with a very low component count but very high performance.

The result is a machine that is ideal as an educational or home computer; it can do quite interesting things without breaking the bank.

The Mirror itself is printed circuit board about 38 by 27.5 cm, bearing a 6502 microprocessor (same as Apple and PET), 8K of RAM and either a machine code monitor in EPROM or Microsoft BASIC in ROM. At the front of the board is a full QWERTY keyboard, with proper

keyswitches; it is possible to touch-type on the Mirror.

Through the use of some very cunning circuit techniques the Mirror also includes a full graphics display. Instead of the conventional divider circuits and what-have-you in a video circuit, the Mirror uses the address bus of the microprocessor itself to do the timing and character generation, in a somewhat more sophisticated version of the ZX-80's video generation.

The standard display format is 44 characters wide by 24 lines, although it can be reprogrammed to 44 by 32 with a 5 by 7 dot matrix character set if required.

The character generator is, in fact, the first section of the monitor ROM, but other character sets can be set up in RAM and used instead. This means that multiple character sets can be used and, with careful design, some clever animation techniques can be achieved.

The Mirror 2000 Reference Manual includes a lot of material on the video techniques, though I'm still not sure I fully understand it — some tricky methods are used. The lack of a circuit diagram doesn't help, but then one can't give all the secrets away!

The manual gives details on setting up character generators in memory for various sizes of characters. My lack of familiarity with 6502 assembly language (coupled with a lack of time) prevented me from trying this, but the instructions seemed fairly clear, and easy to follow.

In graphics mode, the screen format defaults to 128 by 248 pixels, but it can be

reprogrammed to 256 by 256 pixels under user control.

Also on the board is a cassette interface for saving and loading programs; as this requires the processor's full attention, the video is blanked out while a program is loading.

Other expansion capabilities include a sound port (optional, do-it-yourself on the board, supplied on the all-up system), optional RS-232C printer port and an expansion connector for future peripherals and expansion.

The software supplied with the Mirror depends upon which version you buy. The basic unit comes with a machine language monitor, which allows the user to drive the machine at a basic level and write fast action games, and so on.

Early units were supplied with Mirror Systems' own BASIC in EPROM, but now production units have switched over to Microsoft 8K BASIC in ROM, with extensions by Mirror Systems.

The 8K Microsoft BASIC seems to have a lot in it compared to the last time I saw an 8K BASIC. It is supplied with a comprehensive manual from Synertek (manufacturer of the ROM), which lists the various commands statements and functions.

These include the standard BASIC functions, as well as DATA, DEF (user-defined functions), WAIT, ON...GOSUB, RND(X), USR(X), all the string functions and others.

This BASIC is really quite powerful, much more so than its small size would indicate. Mirror Systems has extended it

considerably with the addition of special graphics commands and a full-screen editor.

The graphics mode is set with the MODE command. MODE(1) sets graphics mode, while MODE(0) resets the screen to text. On power-up, the video RAM contains a random pattern which must be cleared using the CLS(X) statement: CLS(0) clears the video RAM to all black, while CLS(1) clears it to white.

Cursor addressing is available in both text and graphics modes, providing a facility similar to PRINT AT, through the use of the CURS(X,Y) statement.

The LINE(X,Y,A,B,C) statement will draw a straight line between two points (X,Y) and (A,B) in colour C (0=black, 1=white). This is probably the most versatile statement in the Graphics BASIC language, as it may be used for business graphics, gameplaying or whatever.

The CIRCLE(X,Y,A,B,N,C) statement draws a circle centred on (X,Y), with the circumference starting at (A,B). The integer N is the number of points forming the circle, and C is the colour, as before. To fully close the circle, N should be 8 times the radius; this allows drawing part circumferences.

PAINT(X,Y,C) will fill in an empty shape starting from the point (X,Y) in colour C (black or white, as before). The point (X,Y) must obviously be totally enclosed by line graphics, as otherwise the painting won't stop until it reaches the edge of the screen. The combination of CIRCLE and PAINT is great for drawing pie charts!

Incidentally, LINE, CIRCLE and PAINT are quite recent newcomers to the BASIC language, having only previously appeared on the IBM PC and Tandy TRS-80 Colour computers.

Graphics points may be set or reset by the SET(X,Y,C) statement, and read with the function C = POINT(X,Y). A nice touch is the implementation of smooth or 'soft' scrolling.

The SCROLL(C) statement, where C=1 to 7, allows the user to set the number of video lines which are scrolled up every 20th of a second (video frame). With SCROLL(1) used, scrolling is very smooth, reducing eye-strain.

The fact that the processor is used to generate the video timing signals reduces the time it spends on actually running BASIC, effectively reducing the speed.

This drawback may be circumvented with the VIDEO(C) statement; VIDEO(0) switches the video off, apparently speeding the processor up, and VIDEO(1) switches it back on again. If video is switched off, a PRINT or INPUT statement will switch it on again.

A full screen editor is provided, which allows the cursor to be moved anywhere on the screen by the control-U (up), D (down), L (left) and R (right) commands.

Specifications and Report Card

Unit:	Mirror 2000
Made By:	Mirror Systems
Processor:	6502A
Clock Speed:	1 MHz (effectively reduced by video circuit)
RAM:	8K
ROM:	varies
I/O:	RS-232C, cassette, keyboard, and screen
Languages:	8K Microsoft BASIC in ROM
Keyboard:	Full QWERTY, nice feel
Display:	44 × 24
Graphics:	128 × 248 (standard)
Peripherals:	
Expansion:	8K RAM and colour video board (under development)
Best Points:	Graphics language, low cost
Worst Points:	Video slowing processor

Ratings:	excellent	very good	good	poor
Documentation:		✓		
Ease of Use:		✓		
Functionality	✓			
Support:	✓			
Value-for-money:	✓			
Extras Included:				
Options:	Synertek/Microsoft BASIC			
Price:	from \$379			
Review Unit from:	Mirror Systems, POBox 186, Belmont, VIC 3216			

All that is required is to move the cursor to the appropriate point and type the corrections. A useful feature is the ability of control-F to copy the character under it to the bottom line — this allows the user to copy most of a line, omitting the parts in error.

The machine language monitor includes the usual commands for examining and changing memory, executing a program, and loading and saving tape programs/data. The manual contains several useful routines, including a section on programming the keyboard.

Also included in the manual is a comprehensive memory map, diagram of video RAM, expansion socket pinout, description of interesting locations in RAM and useful monitor entry points.

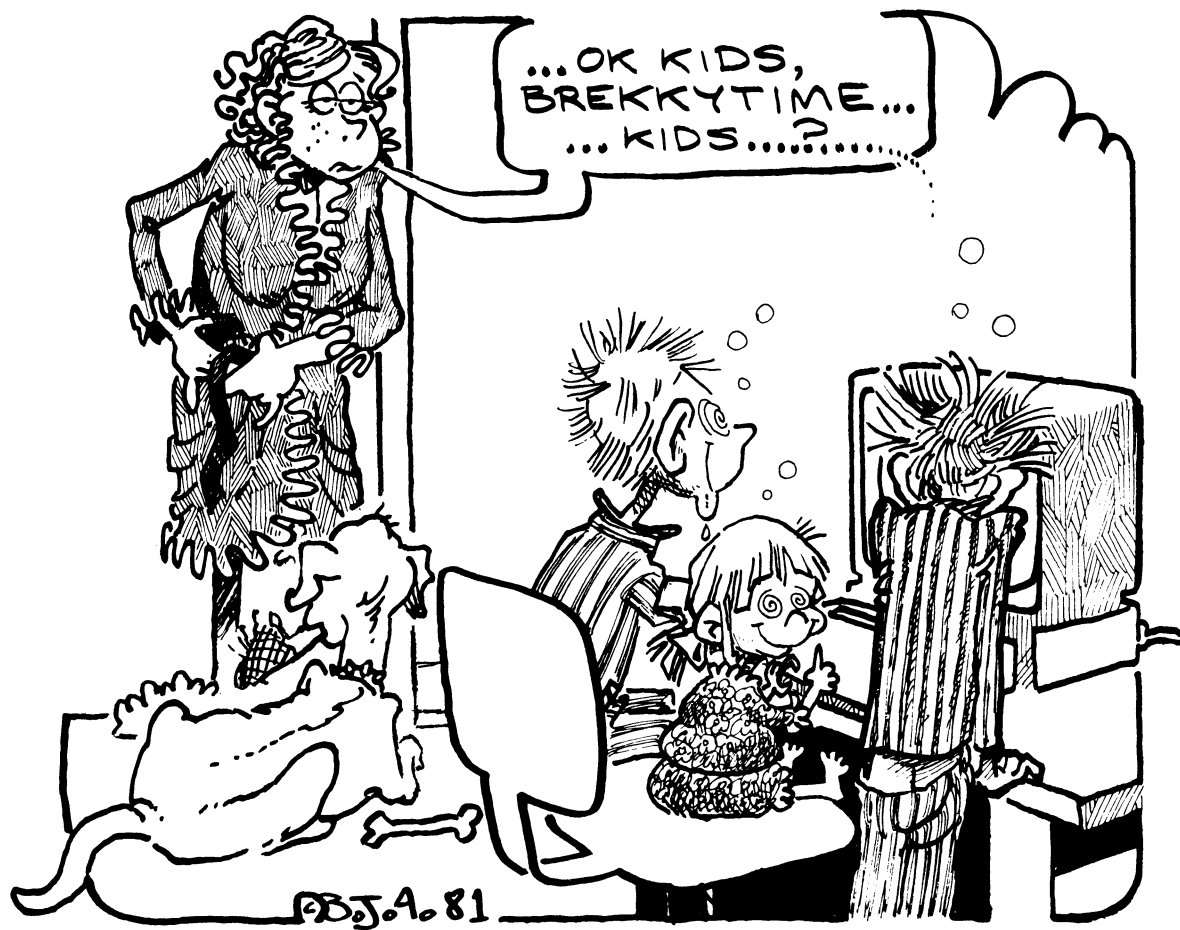
An interesting feature which the manual modestly makes light of is the real time

clock which counts hours, minutes and seconds as long as the video is running.

As mentioned above, several versions of the machine are available: a basic board (needs 5V 2A power supply), for only \$379, a fully enclosed model with speaker and cables at \$439, and a full system, with Microsoft BASIC, enclosure, speaker, cables and power supply at \$599.

The Mirror 2000 is an interesting little machine which offers high performance at very moderate cost. The inclusion of graphics commands into the BASIC is a first for an Australian-made machine, and the system has enough power to provide hours of amusement (or do some serious work).

Our review sample was provided by the manufacturer, Mirror Systems, PO Box 186, Belmont, VIC 3216. ☐



BASIC For Babysitters

By John Annable

AS A WORKING musician who rarely gets to bed on Saturday nights (or Sunday mornings) before 2am I found that I had a small problem.

My children (three, four and ten years of age) having had a refreshing twelve or so hours sleep developed the nasty habit of bouncing out of bed at 6.30 and demanding to be entertained, fed, and so on...

As natural parental feelings are somewhat dulled in such a situation I turned the problem over to my trusty ZX81.

"Right, buddy, everyone calls you a toy! Let's see if you can behave like one."

The two younger children were the main ones to be satisfied. They were no strangers to the keyboard, but soon lost interest when their infantile prodding simply resulted in the computer hanging up and doing nothing particularly stimulating. At this stage they were wont to raid the bicky barrel or continue with their mural on the kitchen wall.

The trusty 81 came to my rescue like a

champ. With a few simple programs the littlies can be entertained happily until their parents decide that the day has matured enough to be dealt with.

I'm sure the psychologists have worked out the ideal parameters for a successful toy and they probably go something like this:

- Brightly coloured.
- Interactive, with an instant, varied reply.
- Sturdy.
- No bits and pieces (this one is my addition, purely a value judgement on behalf of the parents).

Well, the ZX81 loses out on number one, but comes home well on the other points, so if we can just give those childish prods a welcome result our problem will be solved.

The First Program

```
10 LET A = INT (RND*21)
20 LET B = INT (RND*31)
```

```
30 IF INKEY$ = "" THEN GOTO 30
40 PRINT AT A,B; CHR$ ((RND*8) + 1)
50 GOTO 10
```

This program simply waits for a key to be pressed and then prints a random graphic character at a random location on the screen.

Line 30 is most important. If the machine goes ahead and prints its design on its own the child soon loses interest. The knowledge that the computer is obeying their command is what holds their attention.

The problem with the above is that after a while the screen becomes quite full and it is difficult for the little eyes to discriminate the new character so it looks like nothing is happening.

Add the following lines:

```
5 LET X = 0
45 LET X = X + 1
47 IF X = 20 THEN CLS
```



```
48 IF X = 20 THEN GOTO 5
```

An added dimension comes into play as the children enjoy the screen clearing as much as they do the characters being printed.

There are any number of variations to this idea. If the graphics figures are a little small then by adding the following they will be longer and more interesting:

```
42 PRINT AT A,B + 1;CHR$ ((RND*8) + 1)
43 PRINT AT A,B + 2;CHR$ ((RND*8) + 1)
44 PRINT AT A,B + 3;ETC, ETC...
```

Don't type it all — just edit line 40 and change the numbers.

I have found the biggest problem with computer programming is coming up with the ideas. As you can see there is nothing special about this; it is simply a new application.

Next Program, Please

Having watched the display for a while they will get tired of it and demand something new. This is where big brother (the ten-year-old, not George Orwell's mate!) steps in and loads the next program.

```
10 IF INKEY$ = "" THEN GOTO 10
20 FOR J = 1 TO 20
```

```
30 PRINT "(YOUR CHILD'S NAME)"
40 NEXT J
50 CLS
60 GOTO 10
```

This program will print the child's name a number of times after a key is pressed. This then seems to spring up to the top of the screen and stretch down again at the press of another key. Interesting effects can be obtained by putting a comma after the name.

Finally with the use of the SCROLL command exciting things can be made to happen from the bottom of the screen:

```
5 LET A$ = ""
10 LET A = INT (RND*20)
20 IF INKEY$ = "" THEN GOTO 20
30 LET C$ = INKEY$
40 FOR J = 1 TO A
50 LET A$ = A$ + C$
60 NEXT J
70 SCROLL
80 PRINT A$
90 GOTO 5
```

This program reads the key that has been pressed then creates a string of random length consisting of that character repeated. This is printed at the bottom of the screen, scrolled up and then the computer then waits for the next inkey.

Once again this program can be ex-

panded to include graphics characters, the child's name or a special message.

As I said before it is the ideas which are the hardest to come by. I hope the above has stimulated you into preparing your own 'kindergarten' programs.

All that is needed is the IF INKEY\$ = "" THEN GOTO (Same Line). This will cause the computer to wait for an inkey. The program will then be activated no matter what key is pressed. (Apart from break — better tape that one over!)

To conclude I have to point out that in this application the ZX81 keyboard is ideal...no keys to break, no cracks for Vegemite or peanut butter to be jammed in and no danger of the kids being too heavy-handed!

Mum and Dad can rest in peace while the kids are entertained by the micro!

Why not put your imagination to work and come up with some interesting ideas to keep the kids amused. The programs can be expanded so that they can be educational. The children like to name the letter or number that they have called onto the screen.

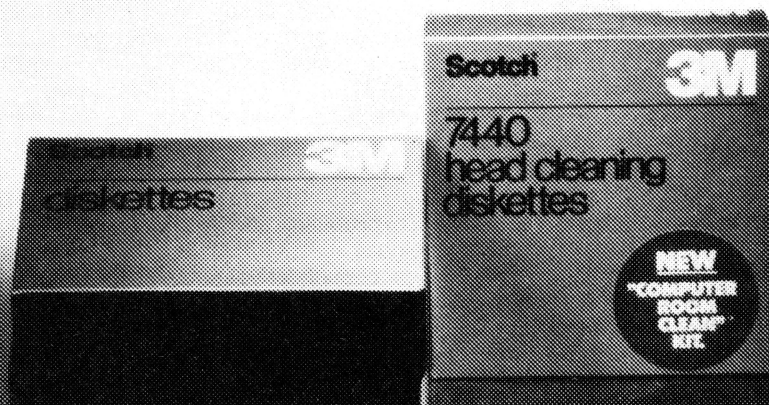
If you have a program to print large letters on the screen then this would also be ideal in this application, but make sure it will work with an inkey — littlies will not hang around long if nothing happens originally and once again your peace will be shattered! □

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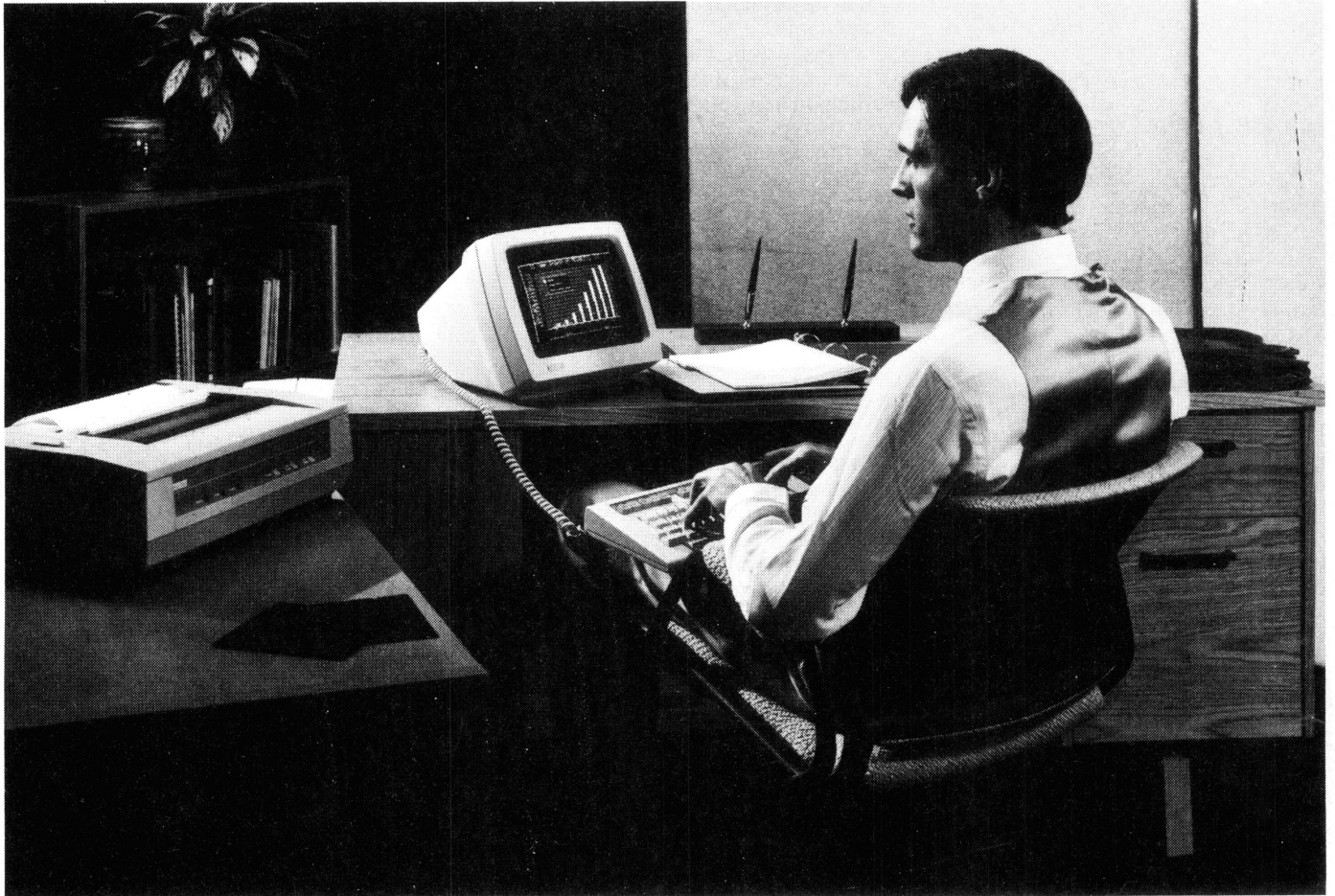
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Delicious, Delectable, Desirable DECS



The name of Digital Equipment Corporation is one which Les remembers fondly from his days programming the PDP-8, the world's first minicomputer. Now DEC has announced its personal computers — some say a bit late, but others would say better right than first...

TWENTY-FIVE years ago a company was formed which started a revolution in computing; the revolution that set the trend towards smaller, cheaper computers. That company is Digital Equipment Corporation, of Maynard, Massachusetts, and its machine, the PDP-1, was the first step towards the minicomputers so common today.

DEC's major step towards personal

computers was the PDP-8, a small 12-bit computer which was inexpensive enough to be dedicated to running laboratory experiments. At last, every scientist and engineer could have his personal computer (at least, that's the way it seemed at the time).

The PDP-8 virtually became a legend, remembered with affection by many who worked with it. With the PDP-8, DEC's fortunes rose, and the introduction of the PDP-11, a 16-bit minicomputer, saw it scale even greater heights.

With the introduction a couple of years back of DEC's VAX series of superminis, it seemed the manufacturer's attention was concentrated on the bigger machines.

Not so, as the release of the new personal computers last month would indicate.

DEC has released three new machines. Although they share a lot of common parts such as cabinets, displays and key-

boards, the three machines are fundamentally different and are targeted at different types of user.

Each has a different processor, operating system and software, but they share a common mechanical design and overall philosophy.

At the bottom of the range is the 'Rainbow 100'. Don't let the cute name fool you: this is no toy or games machine. The central processor isn't — there are, in fact, two processors in there.

A Z-80A handles all disk I/O, while an 8088 looks after the screen and keyboard. Either can function as the main processor, with the other operating at the same time, as they have separate, private memory blocks.

The operating system is (dare I say this?) CP/M — with a difference. Instead of running CP/M-80 or CP/M-86, DEC has a custom hybrid version called CP/M 86/80 which will run Z-80 or 8086 prog-

rams interchangeably without the user knowing or caring which is which.

This will give the Rainbow 100 owner access to a huge range of software, including the new CP/M-86 versions of old CP/M-80 favourites such as WordStar et al. The operating system automatically senses which processor a program was written for and invokes the right one. Presumably that's easy, since Z-80 programs are named program.COM and 8088 ones are program.CMD.

For those who are worried that the IBM PC might have something DEC owners would miss, the word I have is that a version of PC-DOS (alias MS-DOS, alias Seattle Computer's SB-DOS) will also run on the DEC machine.

The machine has 64 Kbytes of RAM as standard, and that is expandable to 256 Kbytes. Built into the cabinet are two 13cm minifloppy drives, each with 400 Kbytes capacity. Two extra drives can be added externally, and there's also a 5 Mbyte micro-Winchester for megalomaniacs.

The display is rather nice, and ideally set up for spreadsheet calculators and similar programs, with 132 columns, horizontal scrolling and other tricks. Although it is memory mapped (hence the dedication of the 8088 to screen), the screen looks to the programmer just like a VT-100, DEC's sophisticated terminal which is seen in all the best places.

The system excels at graphics. Optional bit-map graphics add colour or grey-scale capabilities with a resolution of 960 by 240 and eight colours or shades. The system seems to be pretty quick, too.

The keyboard is slim-line, with 105 keys, and what DEC calls 'Ergodynamic design'. Therefore it must be good...

Other features include serial ports, with two special communications programs. The CX program allows mainframe communication, including transmission and reception of disk files, while the DX program links the Rainbow 100 into DEC's DECmate office systems for block oriented document transfer.

Software for the machine will include the Select Information Word Processor, MBASIC, Microsoft's MULTIPLAN spreadsheet calculator (which, according to reports, is stunning), and the Mark Williams Company C Compiler.

Actually, when I spoke to DEC, opinions were divided (between the American and Australian sales literature) as to whether it would be Whitesmiths or Mark Williams C, but at the time of writing, I don't think Whitesmiths has released an 8086 C compiler.

The pricing on the system is good, with a basic box, 64K RAM, screen and keyboard listing at \$3720 excluding tax and duty, and CP/M-86/80 at \$290. Software pricing is also reasonable.

Decmate II

For some time DEC has been selling a small communicating word processor/office management system called the DECmate. Based on the dear old PDP-8 in its single-chip form, this system has been extensively upgraded, redesigned and brought back to life as the DECmate II personal computer.

Designed for the desk of the high-powered corporate secretary who takes electronic mail and word processing as no less than her due, the II falls in the middle of DEC's new range.

Based on the same box, screen and keyboard as the Rainbow 100, the II uses a Harris 1620 microprocessor with 96K of RAM, the same twin disk drive, but quite different software.

The operating system, COS-310, together with DEC's DIBOL language, should find strong support from existing DEC OEM's, who can transfer their accounting and other applications packages onto the new machine.

The II's word processing software is based upon existing field-proven programs, and is easy to learn. Optional packages include list processing, sort, editor maths, list processing maths and communications.

In addition, the DECmate II will support additional 20cm drives, making it compatible with other DEC computers and word processing equipment. Both the CX and DX communications facilities are supported, while the AX comms option allows an unattended machine to exchange documents.

For those who hanker after CP/M, an optional processor card lets the machine run that operating system. DEC will offer a complete accounting system to run under CP/M at \$690, as well as MBASIC and MULTIPLAN.

DECmate II is priced from \$4280 including system box, dual disks, screen and keyboard, and optional CP/M auxiliary processor. Other options include graphics and mass storage expansion.

Professional 300

The flagship of the line is really two machines, the 325 and the 350. The difference is in the system box, which in the 350 is a few inches wider in order to fit in a mini-winnie.

Both machines are based on the LSI-11/23 processor, a highly integrated version of DEC's super-successful PDP-11 minicomputer, and feature 256K of memory as standard.

The P/OS operating system is derived from the RSX-11 real time operating system for the PDP-11 and supports multi-tasking such as simultaneous word processing, invoice printing and communications.

P/OS does not use a special command

language; instead the user can select functions by moving the cursor on various menus. A computer based instruction course included with the operating system is designed to give the user familiarisation and practice with the machine, while the 'HELP' key can be used to provide help messages on the task being performed.

The 300s will communicate with PDP-11 and VAX computers; in addition direct Ethernet connection and DECnet support are planned for these machines. For developers of large software, a set of software development tools is available that will run on a VAX.

Applications can also be developed on the machine itself, using its BASIC which includes on-line HELP facilities, debugging facilities and graphics commands.

In addition, the 300s will run Visicalc and UCSD Pascal, both of which conform to P/OS standards, allowing integration into menus, directories and help messages used by the series.

The graphics software package for the 300 series conforms to the ACM Special Interest Group in Graphics. This standard, known as the Core Standard, is device independent, but DEC has extended it to include rectangles, circles, arcs and interpolated curves. Co-ordinates for figures can be expressed in either absolute or relative values. More than 20 commands allow users to specify colour, texture, brightness and other parameters.

DEC didn't mean to mention it, but let slip that an auxiliary processor is under development which will allow the 300 series to run CP/M. This means that those upgrading to this machine needn't leave all their software behind.

The Professional 325 is priced at \$4570, and the 350 at \$5720. The optional Winchester is \$4010.

Looking Good

From what I've seen of these machines so far, and my knowledge of DEC as a company, I would say IBM is going to have a struggle on its hands for the top-line professional users. These machines are priced competitively, and their performance should outdo the IBM (though I reserve judgement until I've benchmarked them both).

Certainly DEC in Australia knows a lot more about these products than IBM seems to know about its own.

It is gearing up to support them locally, including the organisation of local software and support. First volume deliveries are due in September; until then it's strictly 'first come, first served'.

Every time a new computer comes out, I tend to be impressed and rave for a while. In this case, I think it's deserved. These computers are about the most sophisticated on the market today — any professional looking for a computer should check them out.

A Likely Latin

Most people think of typewriters when Olivetti is mentioned, but the Italian office-machine giant does a lot more than that. Its latest venture is a new personal computer, and Les Bell took a look at the Australian launch.

HERE IN Australia we are often unaware of just how huge some European companies such as Olivetti are. We see the American multinationals, but the Europeans seem to blend in much more and become part of the scenery.

It was only at the launch of Olivetti's new desk-top professional computer that I realised just how big the company was. With a group turnover of some 2887 billion lire and 53,300 employees, it dwarfs other microcomputer companies.

It is already the largest European manufacturer of office machines and information processing products, and ranks sixth in the world for sales in this sector.

In the eyes of an expectant world, therefore, it is about time Olivetti had a microcomputer on the market. This is particularly true when one remembers its earlier desk-top programmable calculators which pioneered that market.

For those who have been waiting, here it is: the Olivetti M20. Part of Olivetti's Line 1 series of computing equipment, the new machine will be followed by the M40 and M60, which will provide an upward growth path for users.

"This is the first personal computer of this calibre announced in Australia by a major supplier", said Ike Honigstock, managing director of Olivetti Australia.

"We expect our level of sales of this product will put us in the number one position at the professional end of the market".

I'm sure Mr Honigstock realises that won't be as easy as it sounds — there's a lot of competition out there — but the M20 certainly is a well-engineered and innovative machine which is in with a chance.

Based on the SGS-Ates version of the Zilog Z-8001, which is manufactured in Italy, the new machine offers a performance benchmarked at 30 percent better than its major competitors, according to tests done by Olivetti.



The single enclosure contains the processor with 128K of memory, keyboard, video circuitry, two disk drives and miscellaneous interfaces and power supplies. An ergonomically designed display sits on top.

The keyboard is clean and uncomplicated (I've seen Olivetti typewriters with more keys), and the top row can be user defined for use with applications programs. In addition, each key calls for a BASIC keyword, to speed program entry by one-fingered typists. Each disk has an unformatted capacity of 320 Kbytes, while the RAM can be expanded to 224K in 32K increments.

The video monitor can be tilted and rotated on top of the computer for maximum operator comfort (to coin a phrase). A monochrome version is standard, but a colour display is due for release shortly, which will offer display of four colours selected from a palette of eight. Resolution is 512 by 256.

An unusual feature of the display is the ability to split it into up to 16 windows, each of which can individually scroll and generally behave as a separate display.

The operating system, PCOS (Professional Computer Operating System), is loosely modelled on Unix, but with the notable omission of the C programming language on which Unix is founded. The

system language, instead, is BASIC — probably a reasonable choice in view of the scientific/technical/professional orientation of this computer.

The BASIC interpreter is Microsoft BASIC for the Z8000; much the same as MBASIC 5.2, allowing easy transportation of software.

At power-up, the PCOS nucleus, resident commands and the BASIC interpreter are loaded into the system, while the transient commands are left on disk and only loaded when requested. Transient commands can be made resident if required, using the PLOAD and PSAVE commands.

PCOS supports both sequential and random access files, as well as ISAM (Indexed Sequential Access Method) through a B-tree indexed file structure. The BASIC has also been extended to handle IEEE-488 control for instrument interfacing and sophisticated graphics commands.

Other software for the system includes Microsoft's MULTIPLAN spreadsheet calculator, a system self-instruction course, OLIWORD word processing package, OLIENTRY data entry and management package, a sort/merge utility, scientific subroutines library and the MASTER macro language for computer aided instruction.

An interesting facility which many other manufacturers are still working on is remote batch terminal emulation, including 2780/3780/3741 emulation. Finally, for those who find BASIC a little restricting, Pascal will also be available soon.

For accounting applications, Olivetti has bought rights to the IMS suite of software, and this should have been transported on to the machine completely by the time you read this.

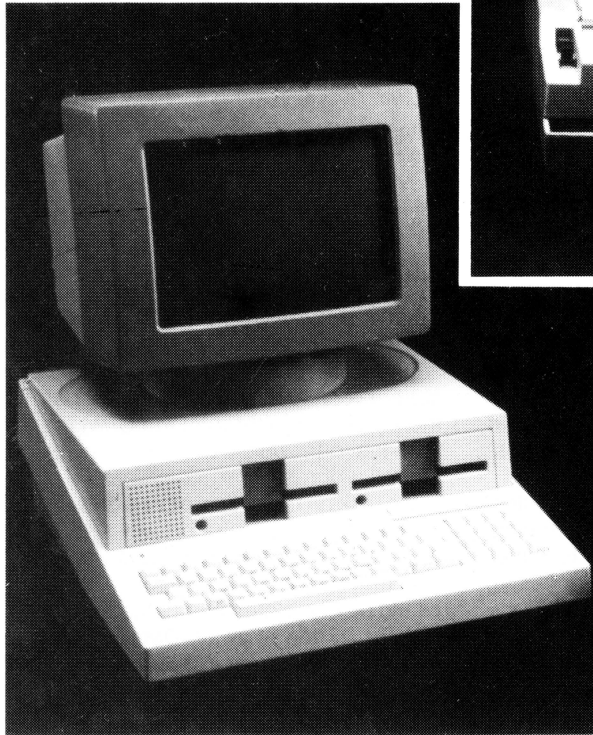
The operating system is single-user only, and single tasking, but considering the power of the processor inside the machine one would have to assume a multi-tasking or even multi-user version must be in the works.

Certainly Olivetti staffers just smiled knowingly when I asked them, and when you consider its windowing would be ideal for multi-tasking, I would say a multi-tasking version of PCOS must be on the cards.

Several printers are available from Olivetti to match the M20, ranging from a low-cost thermal printer to a 140 cps dot matrix printer.

The overall impression I get is of a solid and reputable machine, which will get the job done. Olivetti has a good reputation for after-sales service, so it will probably keep on getting the job done.

Olivetti says a typical set-up will cost around \$6,000. ☐



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Oh Hell, Not Another CPM Review!

In one of Les's other lives he's involved in some fairly heavy project management, with a staff of 35 and distant deadlines which are difficult to meet. Casting around for management tools to help him, he discovered Milestone...

WAIT! FOR those misguided souls out there who think CPM is the world's worst operating system, it's not.

CPM is, in fact, an acronym for Critical Path Method, a pseudo-mathematical system of scheduling tasks so as to complete a project in the minimum time.

Most engineers encounter CPM at university and then forget about it, like I did. They develop a thick-skinned disdain for people who spend their time playing with pieces of string on wall charts instead of getting on with the job.

Milestone is a computer program that changes that by doing everything the wall chart does and more.

But back to CPM, and its close relative PERT (Program Evaluation and Review Technique), for a moment.

The technique used in CPM (which was developed for the Minuteman or Polaris missile project, by the way) is to divide the project into separate tasks and thus conquer it. The idea is that although the overall project may be huge and unmanageable, each sub-task should be controllable, and by noting which tasks affect the overall completion date, and which are 'slack', resources can be applied in the most efficient way to complete the project.

Let me use building an aircraft as an example. This can be broken up into several separate tasks: construction of the fuselage, construction of wings, construction of tail assembly, installation of hydraulics, installation of electrics, structural testing, hydraulics testing, control systems testing, interior finishing, and so on (I know there's more to it than that, but we don't have all month...).

Figure 1 shows how those tasks can be linked together, with each task following those which must be completed before it can start. Note also that several tasks can continue at the same time, but that usually they combine towards the completion of the project. Each activity is marked with a duration, and from these can be

calculated the overall duration of the project.

As well as the completion date, most managers need a few extra pieces of information. As the project progresses, they need to know whether it is on schedule. They need to keep track of costs. They need to know whether a delay in one task will affect the project completion date.

From this last question comes the concept of a *critical path*. The critical path is the longest path through the CPM graph, and the one which has most effect on overall progress.

If a task on the critical path is delayed by a week, then the entire project is set back a week. On the other hand, an ordinary task may well have 'slack time' — that is, it would be completed before the next stage can be started anyway. Delaying such a task, and thus using up slack time, will have no effect on the overall project.

While CPM regards the project as a series of activities, each with a duration, PERT treats it as a series of events, and uses probability techniques to estimate the time required to complete an event.

CPM is best as a planning tool for complex projects, while PERT comes into its own as the project progresses and performance must be monitored.

How Milestone Does It

Milestone shares some of the features of both techniques as well as the flavour of

Gantt charts (a means of plotting performance against time).

It is intended as a general purpose project planner, with two specific objectives: to help the planner clarify the task at hand and to help him communicate his ideas to his subordinates and superiors.

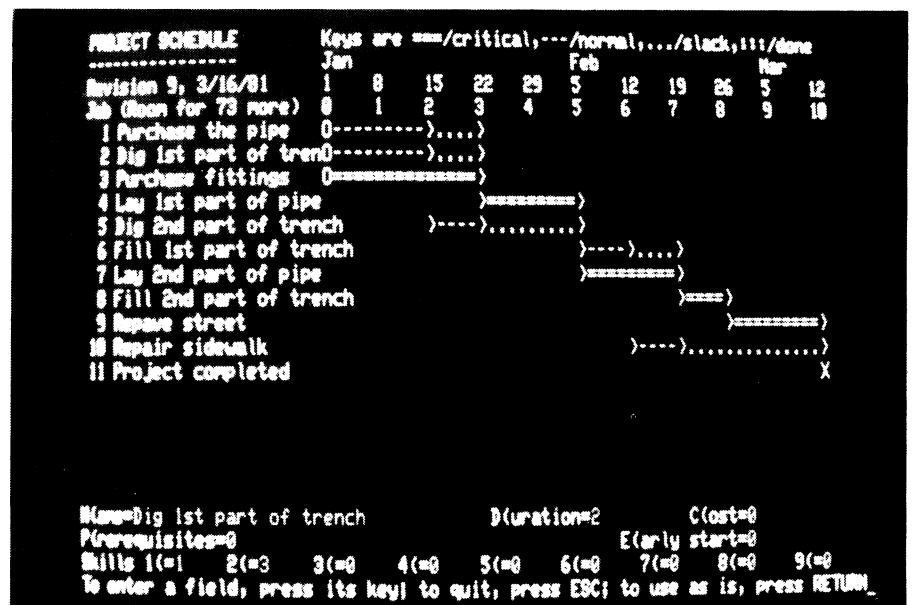
Unlike minicomputer CPM programs, Milestone is interactive, and it is possible to change a project's duration and see Milestone redraw the time schedule instantly. From the time schedule, it is possible to see which jobs are critical and cannot be delayed, which have slack time and can be delayed if necessary, and generally view the flow of work.

In addition, Milestone can prepare a detailed cost estimate for all manpower and direct expenses, and this can be shown on the time schedule as a guide to cash flow requirements.

All of this information can be updated and the situation reviewed interactively, allowing the user to investigate tradeoffs between manpower, time and dollars.

Milestone is a tremendously easy package to use. It was written in Pascal (either Apple or Pascal/m, depending upon your system) and makes good use of the interactive features of that language. All menu displays are fully explained, with one-letter selection of options, and the entire system is menu driven.

On power-up, Milestone reads a work file, and remembers the project you were



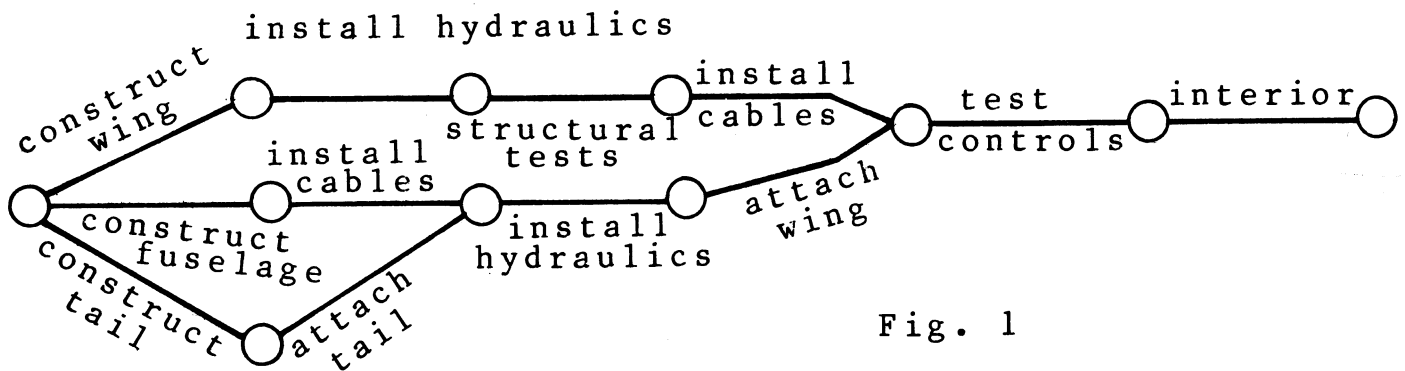


Fig. 1

last working on, the date, your name, and a few other details. Once these items are updated or confirmed, one can either create a new project or load another into memory.

The system then progresses to the main menu, which offers the user a range of things to do.

Most important is the option to modify the project in memory. There are basically four screens-full of information which define a project. First is the *Name, Description and Options* display, which defines the name of the project and its leader, time scale (can be hours, days, weeks, months, quarters or fiscal years), start date, direct and manpower cost units and whether or not the critical path is to be found and displayed.

Entering information into screens is easy. The letter identifying the appropriate data field is pressed, and the cursor moves to the right point; entering new data will automatically delete the old material. Moving on to the next field is just a matter of tabbing, while back-space will move back a field at a time. One can also escape without adopting the changes.

Next the manpower skills and costs are entered. There are nine categories of manpower, and each one is described and given a cost per man-time-unit (that is, man-hour, man-week or whatever). This information will be used by the program to estimate manpower costs.

The third screenful of information is only necessary if working on an hourly or daily basis. It consists of the working hours and days of the week, together with the dates of up to 12 holidays which will occur in the project period. When working on a weekly or longer timescale, this information is irrelevant and need not be filled in.

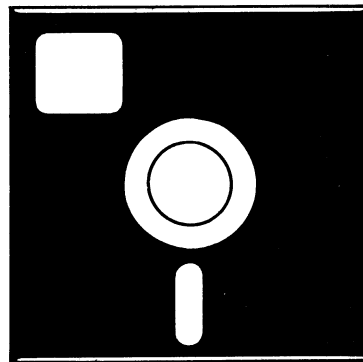
Several features make data entry particularly easy. For example, when entering dates, it frequently occurs that a date has already been entered, and you only wish to add a number of days, weeks or months to update the value.

Milestone allows the user to enter '+' or '-', followed by up to three digits, and then 'd' for days, 'w' for weeks, 'm' for months

or 'y' for years, and the program will automatically move forward or backward through time. That little labour-saving feature is surprisingly useful.

The final page to be entered is the time schedule display. This shows normal jobs, slack time, critical jobs and completed jobs as a time chart, with dates and weeks (or whatever) across the top.

your computer



SOFTWARE REVIEW

At the bottom of the screen is a menu of possible commands.

This is the most important part of the program; really the heart of the matter. Jobs can be added to the chart or inserted into the main flow of the project, modified or even deleted.

A job is entered by filling in various details on a small form which appears at the bottom of the screen. The details consist of the name of the job, its duration, prerequisites (jobs which must be completed before this one can start), early start date (if there are no prerequisites) and the manpower levels required.

The job can be added (or inserted) anywhere in the project sequence, either before or after another job. The difference between adding and insertion is basically in the way the system deals with the prerequisites; in any case, one has the opportunity to edit the prerequisites which

the system suggests.

As jobs are entered, the screen will start to fill, so one will have to use the movement commands which scroll the screen vertically and horizontally after the fashion of a word processor.

In addition, the Home command can be used to redraw the screen with a specified job at top left, so that its dependent jobs basically follow down and across the screen.

As well as these commands, there is an alternate set which allows one to re-number all the jobs, sort them into time order, and display the manpower requirements and costs at the bottom of the screen.

Finally, as the project progresses, jobs can be marked as completed, which makes monitoring progress really easy.

The inputting of information is so easy it can literally be done at the terminal with no prior planning. Perhaps one of the biggest benefits of Milestone is the way it forces the user to clarify his own thinking and break down the project, all the while providing feedback to prevent the entry of erroneous information.

It is rather like working with a huge piece of paper, pencil and rubber — with the added advantage that the paper always stays neat and clear.

Once the manager has organised the project in his own (and the machine's) mind, the next step is to communicate that plan to others in the project team. For this purpose, Milestone will provide a number of different reports.

The most important, obviously, is the time schedule. As I write, I have a large, 40-week chart on the wall above me, with over 40 jobs on it. Because of the width of the chart, it is printed as a series of strips which can then be taped together. The result is neat.

The top of the chart gives the project name, revision number and date, as well as the name of the person who prepared it. Below that, the chart is basically the same as the appearance of the screen, except for the comprehensive weekly breakdown of manpower levels and man-

Job Description	Jan								
	5	7	8	9	10	11	14	15	16
	0	1	2	3	4	5	6	7	8
1 Review prosecutor's file	0====>	.	.	.	.	.	.	.	.
2 Interview agent	.	>====>	.	.	.	.	.	.	.
3 Interview defendant	0----->	>	.	.	.	.	.	.	.
4 Other agency collateral info	.	>----->	>	>	>	>	>	>	>
5 Wait for response	.	.	.	>----->	>	>	>	>	>
6 Follow-up prosecutor&agent	.	.	>=====	=====	=====	=====	=====	=====	=====
7 Verify information	.	>----->	>	>	>	>	>	>	>
8 Interview references	.	>----->	>	>	>	>	>	>	>
9 Evaluate data	.	.	.	.	.	.	.	.	.
10 Compute parole guidelines	.	.	.	.	.	.	.	.	.
11 Re-interview defendant	.	.	.	.	.	.	.	.	.
12 Staff case	.	.	.	.	.	.	.	.	.
13 Obtain stats	0----->	>	>	>	>	>	>	>	>
14 Dictate report	.	.	.	.	.	.	.	.	.
15 Type report	.	.	.	.	.	.	.	.	.

Symbol - Explanation

>-----> Duration of a normal job
 >....> Slack time for a normal job
 >====> Duration of a critical path job
 >:::~> Duration of a completed job
 * Job with zero duration
 0-----> Job with no prerequisites
 >-----X Job with no successors

power and direct costs. At the very bottom corner (neat touch) there's a small chart explaining the significance of the various symbols.

The whole chart is *most* impressive.

Almost as important (some might say more so) is the job description report. This details, for each job, the duration, completion status, whether it is critical, slack time if it is not, prerequisites, manpower skills, costs, direct costs, and the earliest and latest start and finish times.

This report is probably most useful as a discussion or negotiation document. I found it useful in obtaining agreement and commitment from department heads to the timescales and staff levels designated.

The information gives a succinct overview of each job, and the responsible executive can argue his need for more time, staff or money — but as far as I'm concerned, if he gets them (or even if not) he is *absolutely* responsible for the completion of that job on schedule and budget.

An added benefit is that people tend to regard a computer-produced report as being somehow inviolate; they find it difficult to argue, as the report was prepared by the most sophisticated techniques (or so they think). After all, the computer is always right, is it not?

A columnar job report can be laid out by the user to show exactly as much (or as little) information as is required for a particular purpose. This report is very raw data indeed, and can be difficult to read; perhaps an interesting use for it is as input

to another program.

Another option allows output of all the reports without intervention, while the user can also send the reports to another file. This means that reports can be boilerplated into other documents, for example, or fed to other programs.

Getting It Up

Installing Milestone is easy. On an Apple system (for which the program is supplied on a UCSD Pascal disk), it's virtually a case of load and go.

On CP/M systems, with the wide range of terminals available, there's a bit more to it. By PRUNning CONFIG, the user can select his terminal on an extremely comprehensive menu (more terminals than I've seen on any other program), or if his terminal doesn't appear (as mine didn't), enter the control codes in from the terminal manual.

The remainder of the CONFIG program sets up the printer width and miscellaneous parameters — that completes installation.

To train the user in data entry, a program called *Learnhow* is supplied, which allows the user to try his hand without fear of damaging anything — not that he could easily damage Milestone data anyway.

My experience with Milestone has been all good. In managing a fairly large project with 35 staff and very tight timing required, it has proven amazing.

Before using Milestone, I had to have a lot of information mentally 'filed away'; with Milestone that data is now better or-

ganised and I have a much clearer idea of the project's progress. The project description report proved invaluable in negotiation with department managers — they all accepted the timescale estimates without argument, and so far have stuck to them.

Milestone has its limitations, of course, but they are not major ones.

First, in order to maintain high speed, job data is retained in memory, not on disk, and this limits the number of jobs that can be handled: a standard 64K CP/M system has room for 190 jobs, while an Apple can handle 100.

In practice, a project involving 190 jobs is an ideal candidate for a minicomputer CPM program, and the \$20,000 cost of such a program would not be an important consideration in a job that big!

Considering Milestone retails for little over one percent of that figure, it gives a creditable return in capacity.

Organic Software (the author) also very fairly points out in the manual that Milestone does not do resource levelling, resource allocation or probabilistic scheduling. That's most unlikely to be a problem for the average (or indeed, above-average) user.

There's no doubt Milestone is a sophisticated and elegant program with very real application in many professional offices. It is an imaginative, yet useful, application for a microcomputer.

Best of all, I have used it - in earnest - and it works better than I had expected. ☐

COMPUTER

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elsewhere \$ 3.50

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for (no.) books or

Bankcard No.

 Expiry Date.....Signed.....

YCO/M - 1

After his 'Gentle Introduction to Forms Design' last month, editor LES BELL gets right into using those functions in his creation of a 'phone directory program. Despite the length of the listings, he sub-titles it *Designing a Simple Directory*.

Basic for Birdwatchers

Part VIII

A TELEPHONE directory isn't at all like a mailing list.

With a mailing list, you generally want to proceed sequentially through the file, using either all or a selected number of the entries. With a telephone directory, on the other hand, you generally want to look up just one entry, and you don't want to waste time doing it.

Wouldn't it be terrific if there was a way of just looking at a name, and going straight to the right part of the file.

Unfortunately, such a method does not really exist, but there is a technique which comes close. This is called **hashing**, and it is often used in BASIC interpreters, assemblers and similar language processors to provide fast lookup of variables in a table. We're going to apply the idea to this telephone directory to make lookup really fast.

Hashing is basically a way of applying a simple mathematical process to a **key**, in order to yield the ordinal position of the corresponding entry in a table or file. By key, we mean the field of information which we are going to use to retrieve data: in this case, a surname.

The process goes like this: looking at every second letter along the length of the name, we convert it to ASCII and add it to a running total, which we keep doubling. We then divide the result by the number of records in the file, and use the remainder as the position in the file; that is, the record number.

A suitable piece of code to do this might be:

```
10 K=0
20 FOR I=1 TO LEN(N$) STEP 2
30 K=2*K+ASC(MID$(N$,I,1))
40 NEXT I
50 K=K-FS*INT(K/FS)
60 IF K=0 THEN K=1
70 RETURN
52
```

your computer



tutorial

Having arrived at this record number, our job is not yet completed, however.

Avoiding Those Collisions...

A little thought will show that more than one name can still reduce to the same record number. And, of course, we might have two entries with the same name. For this reason, we have to design a **collision avoidance** strategy.

Before writing a new record into place, we read back the contents of the record to see whether there is already a name in place. If there is, then we just go on to the next record and try again.

Eventually, as the file gets very full, this hashing strategy will lose ground as we spend more and more time sequentially searching for the next record, but in the meantime we're ahead of the game.

Let's go ahead and write the program.

```
100 REM ** RANDOM ACCESS TELEPHONE FILER **
110 REM ** WRITTEN IN MBASIC V 5.2 **
120 REM ** 5/3/82 **
130 :
```

Next we define the functions we'll need for screen handling, as well as a couple of miscellaneous constants:

```
140 REM INITIALIZATION SECTION
150 :
160 DEF FNXY$(X,Y)=CHR$(27)+"="+
+CHR$(Y+31)+CHR$(X+31)
170 DEF FNMHT$(A$)=CHR$(27)+" "
+A$+CHR$(27)+" "
180 DEF FNLN$(L)=STRING$(L,95)
190 HOME$=CHR$(30)
200 CLS$=CHR$(27)+CHR$(26)
210 FS=250: ' FILE SIZE, ADJUST IF YOU WANT
220 TLX=100: ' TIME DELAY
```

Next, we start the program off by asking for the file to work on. The program automatically supplies the suffix '.TDR', and if no file name is given, uses the default 'TELE.TDR'. Then we field the buffer for the name and address information:

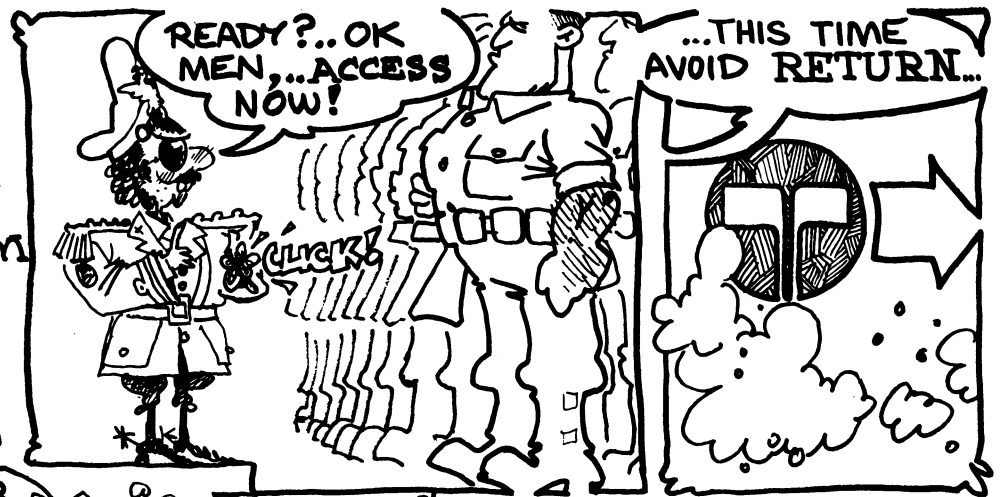
```
230 PRINT CLS$
240 INPUT "Telephone directory file";F$
250 IF F$="" THEN F$="TELE"
260 OPEN "R",#1,F$+".TDR"
270 FIELD #1,20 AS FM$,20 AS FC$,30 AS
FA1$,20 AS FA2$,4 AS FPC$,15 AS
FTEL$,19 AS FCT$
280 :
```

Having initialised the program, we're back with our old friend the menu. This time, however, we avoid the need to type 'RETURN' after making a selection, through the use of the INKEY\$ function. Your BASIC may not have this, or the WHILE function, so you can replace this piece of code with a standard input statement. An alternative to the WHILE construction might be:

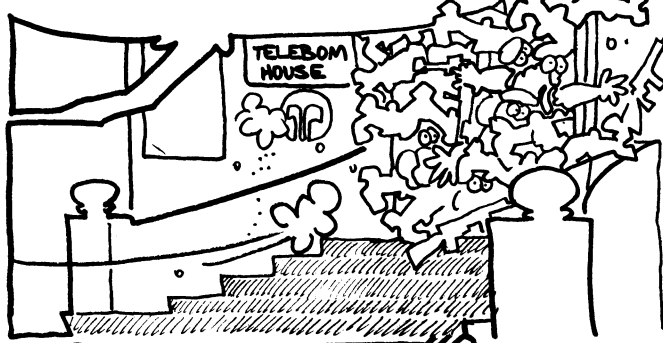
```
400 A$ = INKEY$
410 IF A$ < "1" OR A$ > "7" THEN 400
420 REM CONTINUE
```

Notice also that we are now inputting a string, not a numeric variable, and must

...AFTER HIS GENTLE INTRODUCTION TO FORM LAST MONTH, EDITOR LES BELL'S DESIGNS IN CREATION OF A TELEPHONE DIRECTORY PROGRAM GET RIGHT INTO...



...AND REMEMBER YOUR ENTRY COLLISION AVOIDANCE STRATEGY!



...OBVIOUSLY, MY NAME GIVES ME A CLEAR HISTORICAL CLAIM TO SOVEREIGNTY OVER THE TELECOMA S, OR, TELEBOM TO YOU...



...CONSEQUENTLY, A MEETING OF DISPLACED TELEBOM LEADERS..



HE'S NOT INTERESTED IN TELEBOM FOR IT'S OWN GOOD! ... NO! ...HE ONLY WANTS CONTROL OF THE STARTLING PRIZE SECTION!



AN S.E.C. POWER BLOCKADE WILL KEEP 'EM IN THE DARK!

AARRH... AN' WE'LL SEND IN THE WRAN. WITH A DETACHMENT OF MWS.&DB. COMMANDOS TO CUT OFF THEIR WATER!...

AARRH...

MEANWHILE...

MATT WHELAN PUBLISHER

NEXT ISSUE, THINGS WILL BE BETTER..

BARGE IN

©BJAHRJ.82...

convert it to decimal by using the ASC() function and then subtracting 48 (ASC(0)).

```
290 REM *** DISPLAY MENU ***
300 :
310 PRINT CLS$
320 PRINT "1 - Add name"
330 PRINT "2 - Delete name"
340 PRINT "3 - Create directory file"
350 PRINT "4 - Find name"
360 PRINT "5 - Find comment"
370 PRINT "6 - List file to CON:"
380 PRINT "7 - Quit and return to CP/M"
390 PRINT: PRINT "Enter choice:"
400 A$ = INKEY$
410 WHILE A$ < "1" OR A$ > "7"
420 A$ = INKEY$
430 WEND
440 ON ASC(A$)-48 GOTO 520,1310,920,
1550,1790,1090,480
450 :
```

Exiting MBASIC is easy:

```
460 REM *** EXIT MBASIC ***
470 :
480 PRINT CLS$: CLOSE: SYSTEM
490 :
```

Adding a name to the file is quite simple. First we get all the details for the record:

```
500 REM ** ROUTINE TO ADD A NAME TO FILE **
510 :
520 PRINT CLS$:"Add name to file ":FOR
IX=1 TO TLZ: NEXT IX
530 PRINT CLS$
540 PRINT FNGXY$(1,3);FNHT$("Surname : ");
FNLN$(20)
550 PRINT FNHT$("First Name : ");FNLN$(20)
560 PRINT FNHT$("Street : ");FNLN$(30)
570 PRINT FNHT$("Town/City : ");FNLN$(20)
580 PRINT FNHT$("Postcode : ");FNLN$(4)
590 PRINT FNHT$("Telephone : ");FNLN$(15)
600 PRINT FNHT$("Comment : ");FNLN$(19)
610 PRINT FNGXY$(13,3);:INPUT N$
620 PRINT FNGXY$(13,3);": :N$;
SPACE$(20-LEN(N$))
630 PRINT FNGXY$(13,4);:INPUT C$
640 PRINT FNGXY$(13,4);": :C$;
SPACE$(20-LEN(C$))
650 PRINT FNGXY$(13,5);:INPUT A1$
660 PRINT FNGXY$(13,5);": :A1$;
SPACE$(30-LEN(A1$))
670 PRINT FNGXY$(13,6);:INPUT A2$
680 PRINT FNGXY$(13,6);": :A2$;
SPACE$(20-LEN(A2$))
690 PRINT FNGXY$(13,7);:INPUT PC$
700 PRINT FNGXY$(13,7);": :PC$;
SPACE$(16)
710 PRINT FNGXY$(13,8);:INPUT TEL$
720 PRINT FNGXY$(13,8);": :TEL$;
SPACE$(15-LEN(TEL$))
730 PRINT FNGXY$(13,9);:INPUT CT$
740 PRINT FNGXY$(13,9);": :CT$;
SPACE$(19-LEN(CT$))
```

54



This is simply the screen-handling code developed last month. Next we calculate the hash key. This is used so often it's a separate subroutine at the back of the program:

```
750 REM CALCULATE HASH KEY
760 GOSUB 2040
```

Here's the subroutine:

```
2020 REM ** SUBROUTINE TO CALCULATE HASH KEY **
2030 :
2040 K=0
2050 FOR I=1 TO LEN(N$) STEP 2
2060 K=2*K+ASC(MID$(N$,I,1))
2070 NEXT I
2080 K=K-FS*INT(K/FS)
2090 IF K=0 THEN K=1
2100 RETURN
2110 :
```

It should look familiar. Next we take a look at the record we reckon is our target. If the first character of the name is a space, then the record is empty, and we're free to write into it. Otherwise, we just push on to the next:

```
770 GET #1,K: ' LINE 780 IS COLLISION AVOIDANCE
780 IF LEFT$(FM$,1) <> " " AND
LEFT$(FM$,1) <> ";" THEN K=K+1:GOTO 770
790 REM *** WRITE RECORD TO DISK ***
800 LSET FM$ = N$
810 LSET FC$ = C$
820 LSET FA1$ = A1$
830 LSET FA2$ = A2$
840 LSET FPC$ = PC$
850 LSET FTTEL$ = TEL$
860 LSET FCT$ = CT$
870 PUT #1,K
880 GOTO 310
890 :
```

Actually, in the code above, we also check whether the first character of the name field is a semicolon (;). The reason for that will be seen when we talk about deleting a record.

We mentioned that if the first character of the name field of the target record is a space, then it's okay to write over. But how did the space get there in the first place? Blank disks under CP/M for example contain E5H characters, not spaces; and if they've been written over before by another program there's no telling what may be there.

The answer is that we create the file in advance, and write spaces into the appropriate places. We already had to know the file size in advance for the hash calculation anyway, so we may as well create the file; it can't grow any afterwards. Here's the routine that does that:

```
900 REM ** CREATE EMPTY DIRECTORY FILE **
910 :
920 PRINT CLS$
930 CLOSE
940 PRINT "THIS WILL COMPLETELY OVERWRITE
ANY EXISTING FILE: OK(Y/N)";
950 GOSUB 2130
960 IF A$ <> "Y" AND A$ <> "y" THEN 310
970 INPUT "Name of file to create";F$
980 OPEN "R",1,F$+ ".TDR"
990 FIELD #1,20 AS FM$,20 AS FC$,30 AS
FA1$,20 AS FA2$,4 AS FPC$,15 AS
FTTEL$,19 AS FCT$
1000 LSET FM$=" "
1010 FOR I=1 TO FS
1020 PUT 1,I
1030 PRINT "#";
1040 NEXT I
1050 GOTO 310
1060 :
```

There's nothing particularly tricky about it. Note the use of a subroutine to get in a 'Y' or 'y' answer, again using the INKEY\$ function so that no carriage return is required. Here's the subroutine:

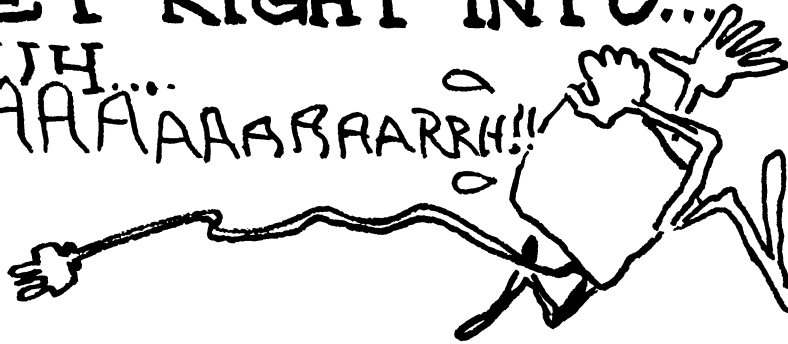
```
2120 REM *** SUBROUTINE TO RETURN Y/N
RESPONSE IN A$ ***
2130 A$ = INKEY$
2140 WHILE A$ <> "Y" AND A$ <> "y"
AND A$ <> "N" AND A$ <> "n"
2150 A$ = INKEY$
2160 WEND
2170 RETURN
```

Again, nothing particularly tricky, so let's press on with a routine to read the file and list it on the console device.

This is just like a sequential read, except that some of the records we read will be empty, and so we should not print them out. That's why, in line 1110, there's a check for an empty record and conditional jump to line 1260 (the NEXT part of the FOR loop). Notice, there's some more pretty formatting on the screen. Heck, if you've paid for it you might as well use it!

GET RIGHT INTO...

...UH...
AAAARRRRH!!!



```
1450 PRINT FNHT$("Comment      : ");FCT$
1460 PRINT FNGXY$(40,24);"Delete (Y/N)";
1470 GOSUB 2130
1480 IF A$ <> "Y" AND A$ <> "y" THEN
      K=K+1:GOTO 1350
1490 LSET FN$ = "; "
1500 PUT #1,K
1510 GOTO 310
1520 :
```

Finding the entry for a particular name is really just a matter of hashing the name and reading forward from that point until either the name is found or a blank record is read:

```
1070 REM   *** LIST FILE TO CON: ***
1080 :
1090 FOR I=1 TO FS
1100 GET #1,I
1110 IF LEFT$(FN$,1)=" " OR LEFT$(FN$,1)
    = ";" THEN 1260
1120 PRINT CLS$;I
      PRINT FNGXY$(1,3);FNHT$
      ("Surname      : ");FN$
1140 PRINT FNHT$("First Name : ");FC$
1150 PRINT FNHT$("Street     : ");FA1$
1160 PRINT FNHT$("Town/City  : ");FA2$
1170 PRINT FNHT$("Postcode   : ");FPC$
1180 PRINT FNHT$("Telephone  : ");FTEL$
1190 PRINT FNHT$("Comment    : ");FCT$
1200 PRINT FNGXY$(40,24);: PRINT "Hit
      space bar to hold, ESC to quit";
1210 FOR IX=1 TO TLX
1220 A$=INKEY$: IF LEN(A$) = 0 THEN 1250
1230 IF A$ = " " THEN IX = 1
1240 IF A$ = CHR$(27) THEN 310
1250 NEXT IX
1260 NEXT I
1270 GOTO 310
1280 :
```

Line 1200 above is interesting — because this is going to the screen, not later, we scroll quickly, but allow the user to hold everything by hitting the space bar, or alternatively, to quit by hitting the ESCape key. This section of code also incorporates a time delay to allow the user to get in before the computer's gone on to the next record.

Of course, there will be occasions when we will want to delete a name from the file, so we must provide a subroutine to do this. A simple method would be to confirm that the record being accessed is the one we want to delete, and then write a space into the name field. However, this approach suffers from a problem.

Our collision-avoidance scheme means that a record may be located several records after its hash-computed position. If the record in the hash-computed position is deleted in this method, when the find name routine reads that record it

will conclude that it is empty and display a 'not found' message, without checking the following record.

To get around this, we mark a deleted record with a semicolon, so that the name search routine knows to check the next record, and keep checking until the name is found or a blank record is read.

```
1290 REM   *** ROUTINE TO DELETE NAME ***
1300 :
1310 PRINT CLS$;"Delete name from file"
1320 PRINT FNGXY$(1,5);:INPUT "Name to
      delete";N$
1330 REM CALCULATE HASH KEY
1340 GOSUB 2040
1350 GET #1,K
1360 IF LEFT$(FN$,1) = ";" THEN
      K=K+1:GOTO 1350
1370 IF LEFT$(FN$,1)=" " THEN PRINT
      CLS$;"Not found":FOR IX = 1 TO
      TLX:NEXT IX:GOTO 310
1380 PRINT CLS$
1390 PRINT FNGXY$(1,3);FNHT$
      ("Surname      : ");FN$
1400 PRINT FNHT$("First Name : ");FC$
1410 PRINT FNHT$("Street     : ");FA1$
1420 PRINT FNHT$("Town/City  : ");FA2$
1430 PRINT FNHT$("Postcode   : ");FPC$
1440 PRINT FNHT$("Telephone  : ");FTEL$
```

```
1530 REM   *** ROUTINE TO FIND NAME ***
1540 :
1550 PRINT CLS$;"Search file for name"
1560 PRINT FNGXY$(1,5);:INPUT "Name to
      find";N$
1570 REM   *** CALCULATE HASH KEY ***
1580 GOSUB 2040
1590 GET #1,K
1600 IF LEFT$(FN$,1) = ";" THEN
      K=K+1:GOTO 1590
1610 IF LEFT$(FN$,1)=" " THEN PRINT
      CLS$;"Not found":FOR N=1 TO 300:
      NEXT N: GOTO 310
1620 PRINT FNGXY$(1,3);FNHT$
      ("Surname      : ");FN$
1630 PRINT FNHT$("First Name : ");FC$
1640 PRINT FNHT$("Street     : ");FA1$
1650 PRINT FNHT$("Town/City  : ");FA2$
1660 PRINT FNHT$("Postcode   : ");FPC$
1670 PRINT FNHT$("Telephone  : ");FTEL$
1680 PRINT FNHT$("Comment    : ");FCT$
1690 PRINT FNGXY$(40,24);"Hit space to
      continue, ESC to quit";
1700 A$ = INKEY$
1710 WHILE A$ <> " " AND A$ <> CHR$(27)
1720   A$ = INKEY$
1730 WEND
1740 IF A$ = " " THEN K=K+1:GOTO 1590
1750 GOTO 310
1760 :
```

SOVEREIGNTY OVER THE TELECOMAS, OR TELEBOM TO YOU...



Finding a comment cannot be done by hashing, as file position depends upon the name, not the comment. Consequently, comments must be found by a sequential search, ignoring empty or deleted records:

```

1770 REM   *** FIND COMMENT ***
1780 :
1790 PRINT CLS$; "Find comment"
1800 PRINT FNGBY$(1,5);:INPUT "Comment
      to search for";CT$
1810 FOR I=1 TO FS
1820 GET #1,I
1830 IF LEFT$(FM$,1) = " " OR LEFT$(FM$,1)
      = ";" THEN I=I+1: GOTO 1820
1840 IF LEFT$(FCT$,LEN(CT$)) <> CT$ THEN 1990
1850 PRINT CLS$;
1860 PRINT FNGBY$(1,3);FNHT$
      ("Surname   : ");FM$
1870 PRINT FNHT$("First Name : ");FC$
1880 PRINT FNHT$("Street    : ");FA1$
1890 PRINT FNHT$("Town/City : ");FA2$
1900 PRINT FNHT$("Postcode   : ");FPC$
1910 PRINT FNHT$("Telephone  : ");FTEL$
1920 PRINT FNHT$("Comment    : ");FCT$
1930 PRINT FNGBY$(40,24);: PRINT "Hit
      space bar to hold, ESC to quit";
1940 FOR IZ=1 TO TLZ
1950 A$=INKEY$: IF LEN(A$) = 0 THEN 1980
1960 IF A$ = " " THEN IZ = 1
1970 IF A$ = CHR$(27) THEN 310
1980 NEXT IZ
1990 NEXT I
2000 GOTO 310
2010 :

```

That completes our first telephone directory program. It provides surprisingly fast lookup of a name, and reliable operation. However, there are a few points that should be noted.

Firstly, the hashing algorithm used is very simple, and could be improved greatly. For example, it uses only every second letter of the name, and is intolerant of spelling mistakes. During my tests

of this program I also noticed that the names were tending to cluster in the first half of the file, but perhaps the names I used were not a representative sample.

This program could be used as a 'test bed' for other hashing methods simply by modifying the hash subroutine. Remember, though, that the program cannot access a file created with another hash method.

Another point is that the file is not in alphabetical order. This is okay as long as you know a name exactly, but if you remember only that 'it starts with a B', then there is no way to predict, even roughly, where in the file it is stored.

Finally, to assist you in keying in the program, here it is in its entirety: ☐

```

100 REM   *** RANDOM ACCESS TELEPHONE FILER ***
110 REM   *** WRITTEN IN MBASIC V 5.2 ***
120 REM   *** 5/3/82 ***
130 :
140 REM   INITIALIZATION SECTION
150 :
160 DEF FNGBY$(X,Y)=CHR$(27)+ "=" + CHR$(Y+31) + CHR$(X+31)
170 DEF FNHT$(A$)=CHR$(27)+ " " + A$ + CHR$(27)+ " ("
180 DEF FNLN$(L)=STRING$(L,95)
190 HOME=CHR$(30)
200 CLS%=CHR$(27)+CHR$(26)
210 FS=250:      ' FILE SIZE, ADJUST IF YOU WANT
220 TLZ=100:    ' TIME DELAY
230 PRINT CLS$
240 INPUT "Telephone directory file";F$
250 IF F$="" THEN F$="TELE"
260 OPEN "R",#1,F$+".TDR"
270 FIELD #1,20 AS FM$,20 AS FC$,30 AS FA1$,20 AS FA2$,4 AS
      FPC$,15 AS FTEL$,19 AS FCT$
280 :
290 REM   *** DISPLAY MENU ***
300 :
310 PRINT CLS$
320 PRINT "1 - Add name"
330 PRINT "2 - Delete name"
340 PRINT "3 - Create directory file"
350 PRINT "4 - Find name"
360 PRINT "5 - Find comment"
370 PRINT "6 - List file to COM:"
380 PRINT "7 - Quit and return to CP/M"
390 PRINT:PRINT "Enter choice:"
400 A$ = INKEY$
410 WHILE A$<"1" OR A$ > "7"
420   A$ = INKEY$
430 WEND
440 ON ASC(A$)-48 GOTO 520,1310,920,1550,1790,1090,480
450 :

```

```

460 REM   *** EXIT MBASIC ***
470 :
480 PRINT CLS$: CLOSE: SYSTEM
490 :
500 REM   *** ROUTINE TO ADD A NAME TO FILE ***
510 :
520 PRINT CLS$; "Add name to file ":FOR IZ=1 TO TLZ: NEXT IZ
530 PRINT CLS$
540 PRINT FNGBY$(1,3);FNHT$("Surname   : ");FNLN$(20)
550 PRINT FNHT$("First Name  : ");FNLN$(20)
560 PRINT FNHT$("Street     : ");FNLN$(30)
570 PRINT FNHT$("Town/City  : ");FNLN$(20)
580 PRINT FNHT$("Postcode   : ");FNLN$(4)
590 PRINT FNHT$("Telephone  : ");FNLN$(15)
600 PRINT FNHT$("Comment    : ");FNLN$(19)
610 PRINT FNGBY$(13,3);:INPUT N$
620 PRINT FNGBY$(13,3);: "N$;SPACE$(20-LEN(N$))
630 PRINT FNGBY$(13,4);:INPUT C$
640 PRINT FNGBY$(13,4);: "C$;SPACE$(20-LEN(C$))
650 PRINT FNGBY$(13,5);:INPUT A1$
660 PRINT FNGBY$(13,5);: "A1$;SPACE$(30-LEN(A1$))
670 PRINT FNGBY$(13,6);:INPUT A2$
680 PRINT FNGBY$(13,6);: "A2$;SPACE$(20-LEN(A2$))
690 PRINT FNGBY$(13,7);:INPUT PC$
700 PRINT FNGBY$(13,7);: "PC$;SPACE$(16)
710 PRINT FNGBY$(13,8);:INPUT TEL$
720 PRINT FNGBY$(13,8);: "TEL$;SPACE$(15-LEN(TEL$))
730 PRINT FNGBY$(13,9);:INPUT CT$
740 PRINT FNGBY$(13,9);: "CT$;SPACE$(19-LEN(CT$))
750 REM CALCULATE HASH KEY
760 GOSUB 2040
770 GET #1,K:      ' LINE 780 IS COLLISION AVOIDANCE
780 IF LEFT$(FM$,1) <> " " AND LEFT$(FM$,1) <> ";" THEN
      K=K+1:GOTO 770
790 REM   *** WRITE RECORD TO DISK ***
800 LSET FM$ = N$
810 LSET FC$ = C$
820 LSET FA1$ = A1$
830 LSET FA2$ = A2$
840 LSET FPC$ = PC$
850 LSET FTEL$ = TEL$
860 LSET FCT$ = CT$
870 PUT #1,K
880 GOTO 310
890 :
900 REM   *** CREATE EMPTY DIRECTORY FILE ***
910 :
920 PRINT CLS$
930 CLOSE
940 PRINT "THIS WILL COMPLETELY OVERWRITE ANY EXISTING
      FILE: OK(Y/N)";
950 GOSUB 2130
960 IF A$ <> "Y" AND A$ <> "y" THEN 310
970 INPUT "Name of file to create";F$
980 OPEN "R",#1,F$+".TDR"
990 FIELD #1,20 AS FM$,20 AS FC$,30 AS FA1$,20 AS FA2$,4 AS
      FPC$,15 AS FTEL$,19 AS FCT$
1000 LSET FM$=""
1010 FOR I=1 TO FS
1020   PUT #1,I
1030   PRINT "I";
1040   NEXT I
1050   GOTO 310
1060 :
1070 REM   *** LIST FILE TO COM: ***
1080 :
1090 FOR I=1 TO FS
1100   GET #1,I
1110   IF LEFT$(FM$,1)="" OR LEFT$(FM$,1) = ";" THEN 1260
1120   PRINT CLS$;I
1130   PRINT FNGBY$(1,3);FNHT$("Surname   : ");FM$
1140   PRINT FNHT$("First Name  : ");FC$
1150   PRINT FNHT$("Street     : ");FA1$
1160   PRINT FNHT$("Town/City  : ");FA2$
1170   PRINT FNHT$("Postcode   : ");FPC$
1180   PRINT FNHT$("Telephone  : ");FTEL$
1190   PRINT FNHT$("Comment    : ");FCT$
1200   PRINT FNGBY$(40,24);: PRINT "Hit space bar to hold, ESC
      to quit";
1210   FOR IZ=1 TO TLZ
1220     A$=INKEY$: IF LEN(A$) = 0 THEN 1250
1230     IF A$ = " " THEN IZ = 1

```




```

1240 IF A$ = CHR$(27) THEN 310
1250 NEXT IZ
1260 NEXT I
1270 GOTO 310
1280 :
1290 REM   *** ROUTINE TO DELETE NAME FROM FILE ***
1300 :
1310 PRINT CLS$;"Delete name from file"
1320 PRINT FN$Y$(1,5);:INPUT "Name to delete";N$
1330 REM CALCULATE HASH KEY
1340 GOSUB 2040
1350 GET #1,K
1360 IF LEFT$(FN$,1) = ";" THEN K=K+1:GOTO 1350
1370 IF LEFT$(FN$,1) = " " THEN PRINT CLS$;"Not found":FOR IZ
    = 1 TO TL$:NEXT IZ:GOTO 310
1380 PRINT CLS$
1390 PRINT FN$Y$(1,3);FNHT$("Surname      ");FN$
1400 PRINT FNHT$("First Name   : ");FC$
1410 PRINT FNHT$("Street       : ");FA1$
1420 PRINT FNHT$("Town/City    : ");FA2$
1430 PRINT FNHT$("Postcode     : ");FPC$
1440 PRINT FNHT$("Telephone    : ");FTEL$
1450 PRINT FNHT$("Comment      : ");FCT$
1460 PRINT FN$Y$(40,24);"Delete (Y/N)";
1470 GOSUB 2130
1480 IF A$ < "Y" AND A$ > "Y" THEN K=K+1:GOTO 1350
1490 LSET FN$ = ";"
1500 PUT #1,K
1510 GOTO 310
1520 :
1530 REM   *** ROUTINE TO FIND NAME ***
1540 :
1550 PRINT CLS$;"Search file for name"
1560 PRINT FN$Y$(1,5);:INPUT "Name to find";N$
1570 REM   *** CALCULATE HASH KEY ***
1580 GOSUB 2040
1590 GET #1,K
1600 IF LEFT$(FN$,1) = ";" THEN K=K+1:GOTO 1590
1610 IF LEFT$(FN$,1) = " " THEN PRINT CLS$;"Not found":FOR
    N=1 TO 300:NEXT N: GOTO 310

```



```

1620 PRINT FN$Y$(1,3);FNHT$("Surname      ");FN$
1630 PRINT FNHT$("First Name   : ");FC$
1640 PRINT FNHT$("Street       : ");FA1$
1650 PRINT FNHT$("Town/City    : ");FA2$
1660 PRINT FNHT$("Postcode     : ");FPC$
1670 PRINT FNHT$("Telephone    : ");FTEL$
1680 PRINT FNHT$("Comment      : ");FCT$
1690 PRINT FN$Y$(40,24);"Hit space to continue,
    ESC to quit";
1700 A$ = INKEY$
1710 WHILE A$ <> " " AND A$ <> CHR$(27)
1720   A$ = INKEY$
1730 WEND
1740 IF A$ = " " THEN K=K+1:GOTO 1590
1750 GOTO 310
1760 :
1770 REM   *** FIND COMMENT ***
1780 :
1790 PRINT CLS$;"Find comment"

```

```

1800 PRINT FN$Y$(1,5);:INPUT "Comment to search for";CT$
1810 FOR I=1 TO FS
1820 GET #1,I
1830 IF LEFT$(FN$,1) = " " OR LEFT$(FN$,1) = ";" THEN I=I+1:
    GOTO 1820
1840 IF LEFT$(FCT$,LEN(CT$)) <> CT$ THEN 1990
1850 PRINT CLS$;
1860 PRINT FN$Y$(1,3);FNHT$("Surname      ");FN$
1870 PRINT FNHT$("First Name   : ");FC$
1880 PRINT FNHT$("Street       : ");FA1$
1890 PRINT FNHT$("Town/City    : ");FA2$
1900 PRINT FNHT$("Postcode     : ");FPC$
1910 PRINT FNHT$("Telephone    : ");FTEL$
1920 PRINT FNHT$("Comment      : ");FCT$
1930 PRINT FN$Y$(40,24);: PRINT "Hit space bar to hold,
    ESC to quit";
1940 FOR IZ=1 TO TL$
1950 A$=INKEY$: IF LEN(A$) = 0 THEN 1980
1960 IF A$ = " " THEN IZ = 1
1970 IF A$ = CHR$(27) THEN 310
1980 NEXT IZ
1990 NEXT I
2000 GOTO 310
2010 :
2020 REM   *** SUBROUTINE TO CALCULATE HASH KEY ***
2030 :
2040 K=0
2050 FOR I=1 TO LEN(N$) STEP 2
2060 K=28K+ASC(MID$(N$,I,1))
2070 NEXT I
2080 K=K-FS*INT(K/FS)
2090 IF K=0 THEN K=1
2100 RETURN
2110 :
2120 REM   *** SUBROUTINE TO RETURN Y/N RESPONSE IN A$ ***
2130 A$ = INKEY$
2140 WHILE A$ <> "Y" AND A$ <> "y" AND A$ <> "N" AND A$ <> "n"
2150   A$ = INKEY$
2160 WEND
2170 RETURN

```

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This is what Reg Hespe, Technical Officer of Gladesville had to say about 'Super 80'
"I enjoyed building the Super 80 project and felt it worthwhile, of immense educational value and quite easy to construct. It worked as soon as I turned it on and has provided many hours of enjoyment".

Very Advanced design — but works with any TV set!

The 'Super 80' offers a specification that we believe just cannot be bettered at the price. It uses the popular Z80 Microprocessor IC, a professional keyboard and has direct RF output so that you can use the computer with any TV set (you don't need to purchase a special video monitor).

Easy to build

Even though we would not recommend this kit to the raw beginner, it is very easy to build. Any person who can use a small soldering iron and can solder neatly should have no difficulty in construction. This is because of the unique double-sided board design which means there is virtually no other wiring. The board is covered with professional 'solder mask'; this makes soldering much easier without the problems of bridges, etc. Once the components are soldered onto the board in their marked positions over 98% of the construction is completed. Even if you cannot get the completed kit to work, we have a special "Sorry Dick it doesn't work" repair service to assist you.

NEW lower price, higher specification - how is it done?

Most computers sold in Australia are manufactured in the U.S.A. where extremely high labour rates prevail - and you pay dearly for this on built up units. With this computer kit, you provide the labour and therefore save a fortune. And remember, this computer does not have a small toy-like calculator keyboard but a full size professional typewriter keyboard.

Advanced programming capability

The Super 80 Computer gives you a huge 9K of BASIC — comparable in fact, with the BASIC on our very popular Sorcerer computer (over 2000 sold) — and this machine sells for over \$1,000. Many other computers currently available do not offer as much BASIC programming capability as the SUPER 80 — it is obvious that by building it yourself you are saving real money!

Imagine how much you will learn!

Most computer enthusiasts can program a computer but would have absolutely no idea of how to build one. By building this kit you will learn both the technical side of construction, how it works and then how to program. What a fantastic background for the future.

Sectional construction

We have designed this kit not only for the serious computer user but also for first time users like the student or hobbyist. This is why we have a short form kit which may be added to as you build (and as you have the money!). For example, you may build the computer originally and operate it with 'BASIC on tape' and then add 'BASIC in ROM', add the S-100 and provide other parts at a later stage.

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“Hotting-Up” Your ZX80!

By David Johnson

IT SEEMS a lot of people who have bought ZX80/81s are a little disillusioned by their performance. Just have a look at the For Sale sections of the electronic and computer mags.

I must admit I felt the ZX80 was the answer to my desire to own a micro-computer...well, here are a few of the modifications I have found useful.

First, having a display with black letters on a white screen causes poor EHT regulation in some television receivers, which then exhibit an effect called blooming. This causes the letters to appear fuzzy or out of focus. To overcome this there is an option built into the ZX80 that allows you to change the display to white letters on a black screen.

To do this remove all of the plastic rivets and carefully remove the cover and then the PC board; don't forget the three rivets in the middle of the board! Now turn the board over and you will see three points marked A, B, and C in approximately the centre of the right hand side. You will notice that only A and C are joined by a copper track. The mod involves cutting across this track with a knife and soldering a link between A and B.

Can't Stand The Heat?

Now, how about the cassette interface ...how often have you found that you couldn't load or store programs reliably? I found this a continuing hassle.

The problem is heat related, as admitted in The ZX80 Companion booklet and on the information sheets supplied with the cassette packs. This seems to be caused by two design errors. The 9V mains adapter that was supplied with my system measured 14V — which means a lot of volts have to be dissipated as heat in the 5V regulator on the PC board.

My solution to this may be a bit drastic for you. I pulled the mains adapter transformer apart and unwound some of the secondary windings to drop its output voltage. Another alternative is to use another

mains adapter that you may already own for your cassette player.

The other error is the mounting of the 5V regulator itself. Yes, it is mounted on a heatsink and is insulated from the board to try and keep the buffer transistor for the cassette interface cool. But this is not enough.

I added some extra fins to the heatsink which protrude through the 'supercharger hump' on the top of the case to allow more cooling, painted it all black and added some heatsinking compound to the underside of the regulator.

If you live in a city where Channel 0 is transmitting you will have noticed interference with your Channel 1 modulator. The video output feeding the modulator is at a high enough level to be fed straight into the video input of most receivers or monitors without a buffer circuit (if video input is available or can be added).

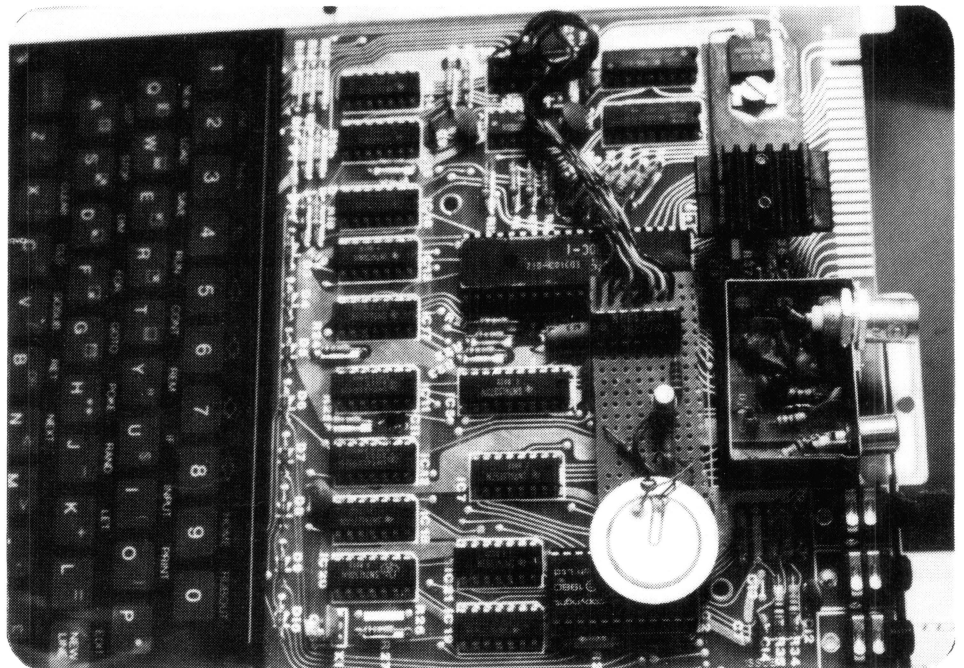
You will find that this will also improve

the resolution slightly. The video output socket can be mounted directly into the modulator for extra strength by cutting an appropriate sized hole, and connected to the flying lead entering closest to the rear of the modulator. This is the video input to the modulator. The earth connection is made via the metal chassis of the modulator.

Another Keyboard Alternative

How often have you hit one of the little keys and wondered if it has actually made contact? Or you have been watching the screen to see that tell-tale vision flash and then lost your place on the keyboard or program?

Well, here is another mod that will give some tactile response. It involves adding a piezo buzzer that beeps every time a key is pressed. It is not quite as simple as the previous mods and since I own a ZX80 and not a ZX81 I can only give you a circuit



for the ZX80, but I'm sure it is also possible for the ZX81 with some thought.

In true ZX80 spirit I have made it as cheap but effective as possible — the total cost is less than \$5.

The piezo element is available from your local Tandy store, and the 7430 IC, transistor and so on from Dick Smith. This little circuit feeds the data lines from the keyboard into a NAND GATE (7430). When a key is pressed, one of the data lines goes low forcing the output of the NAND GATE high. This turns on the driver transistor of the piezo element; that is, it beeps. If you have any trouble with it not beeping try adjusting the base resistors.

Construction involves mounting the 7430, transistor driver, piezo element and other items on a piece of vero board.

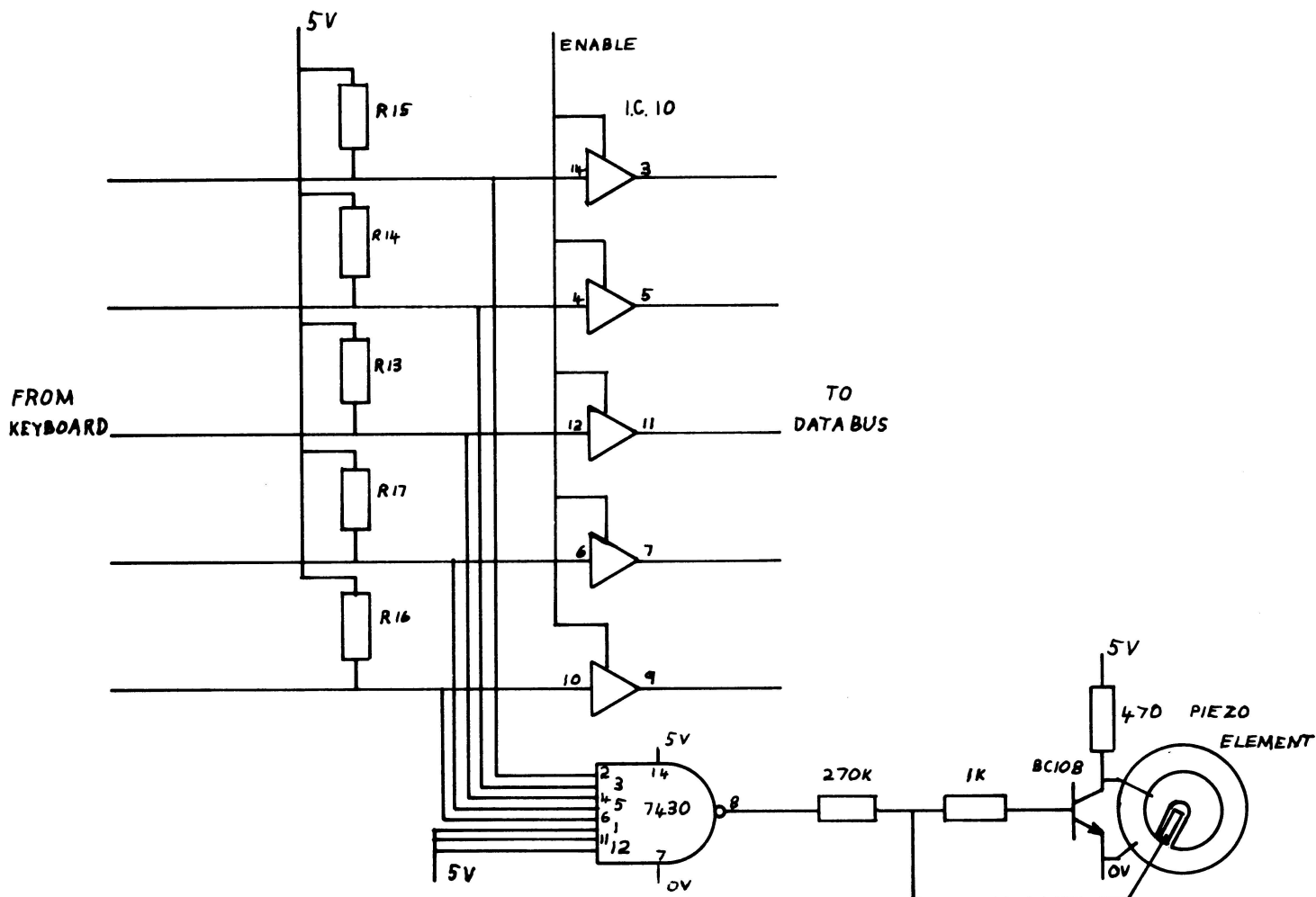
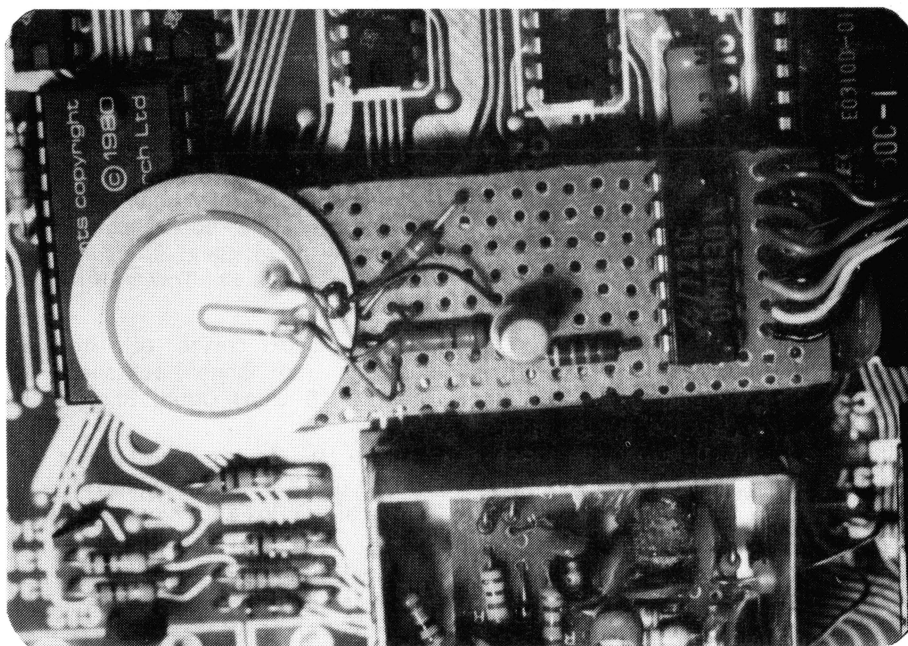
A Silicone Job

Silicone rubber was used to mount the piezo element on the vero board and, due to the lack of any other mounting points, to mount the vero board straddled between the ROM and the Z80. Don't make the mistake I made, though, of putting a dob of silicone rubber in the center of the piezo element. This stops it from being able to beep. Took me a while to work that one out...

I made the connections to the main board directly onto the data strobe IC. This is not standard practice, but eases construction. As long as you tin all your leads and the legs of the IC first before

soldering them together, there should not be any damage done by excessive heat.

So don't discard your ZX80/81, or put it up on the shelf to gather dust — it will be faithful to you if you are faithful to it. □



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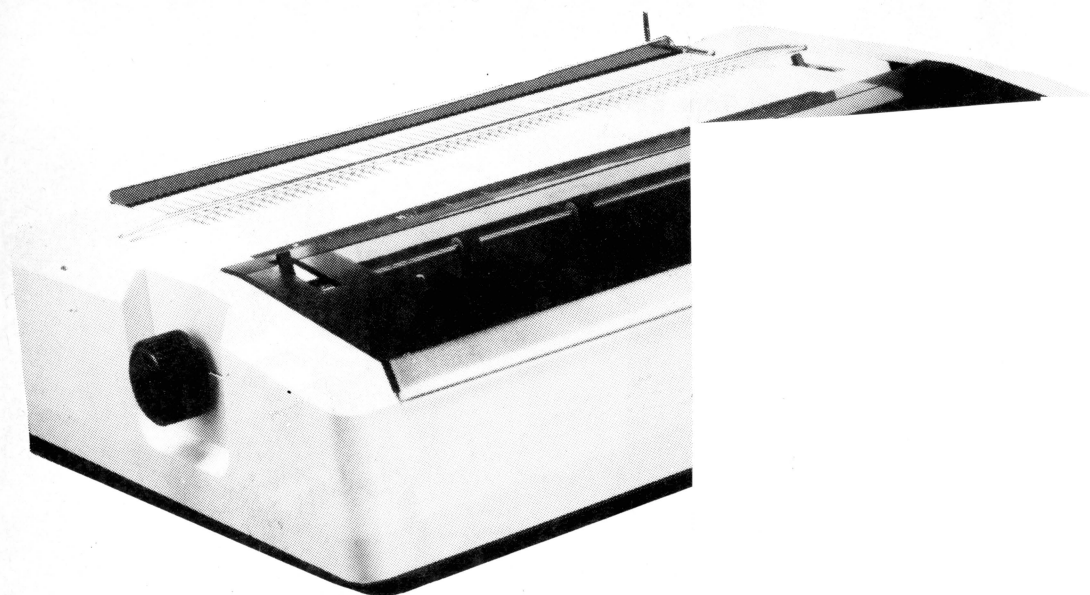
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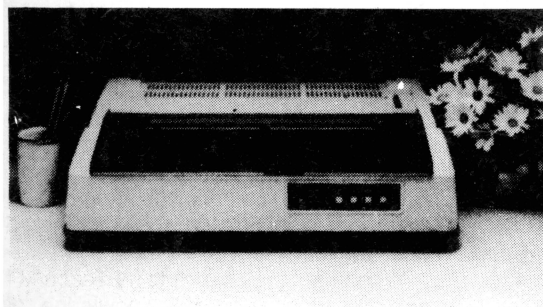
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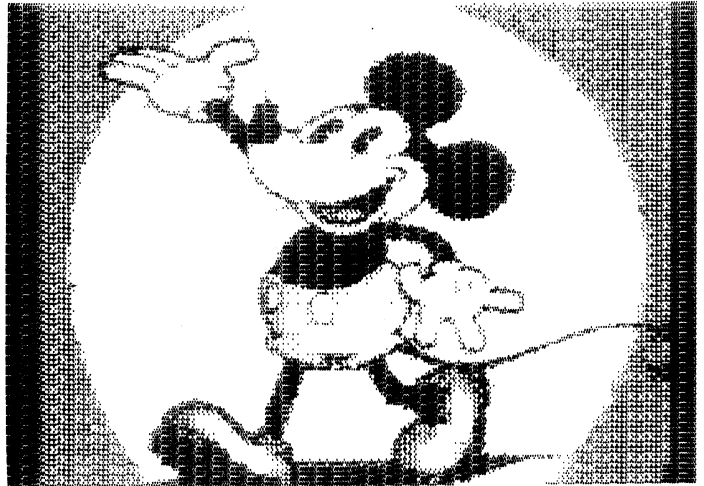
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DEALER ENQUIRIES WELCOME

Off To The Faire

By Tom Booy



AN AMAZING 40,000 people, 600 exhibitors and 100 lectures made up this year's Computer Faire in San Francisco.

Computer buffs entering the exhibition centre must feel like kids at Christmas time; it's just as hard to decide which stand to see first as it is to pick which present to open.

To get the most out of this three-day spectacle it pays to plan in advance which lectures you want to attend and which suppliers you wish to see.

The first impression is one of utter bewilderment at the large crowds and the noise from synthesisers and space invaders.

Exhibitors' booths are spread over three floors and, because of space shortages, are even located in the hallways.

This was my second Computer Faire, so I had planned my visit a bit better than last year. My aim was to have a look at hard disks, find out as much as possible about Bar Coding, and have a close look at new operating systems.

Like most well laid out plans it didn't work that way; I could only find two hard disks at the entire show, nobody could give me anything concrete on bar Coding and there were no new operating systems on the market!

So what was new? First impression: last year the show was dominated by TRS 80s and Apples, about 60 to 40; this year there were hardly any TRS 80s but Apple was still very much in the forefront.

The big surprise was the large number of Ataris, and other new machines: IBM, Rank Xerox, the Osborne, a large stand from Commodore and a number of machines with names I have never heard of before in my life.

There were more, and better, colour graphics, while some of the new space games make the old space invaders look like a Sunday afternoon's picnic. There were also more sophisticated printers, and one could spend days and days with the eight-colour plotters which are capable of drawing real works of art.

One of the greatest attractions are the bargains and it is obvious that many visitors do purchase vast quantities of equipment, software, books and magazines. One of the best buys was a small printer (\$US99.95) printing on 12cm wide paper, capable of quite good graphics. Another was a conversion for a TRS 80 Model III, from 48K to 64K, by taking out one of the chips and replacing it with a small board, for \$US145.

If you wanted to buy disks, the best thing to do was to have a look around and see what the prices were on various stands. Disks have a habit of becoming cheaper on the last day of the show — the lowest price I saw this year was \$1.20 for a 13cm disk.!

Like all shows it is Caveat Emptor, buyer beware; the \$1.20 disks were in blank covers without a name so it would be pretty difficult to complain if they were no good.

The IBM Followers

It never ceases to amaze me: the moment a large corporation brings out a new machine, it also immediately creates a new cottage industry for the product.

The new IBM was supported by two new magazines dedicated to it, and the number of stands with bits and pieces for this machine was quite surprising.

I was lucky enough to have a play

around with the IBM. My conclusions included one very positive and one very negative point. What I liked very much was the editing facility — after a bit of practice you make the cursor fly around the screen to where you want it and make your corrections very fast.

The part I disliked was the buffered keyboard; the screen could be up to five characters behind the keyboard, and every so often you had to wait for the screen to catch up. The owner did tell me that this was not meant to be that way. He had sent it back twice for this to be corrected but so far IBM had been unable to do so.

Education is no doubt a large and mostly unexplored field in micros. There are, of course, a lot of programs teaching the traditional "three Rs" but I have not seen many programs teaching how to operate a DOS. Tandy has one, but that is a straightforward reading from the screen and you answer a few questions every so often.

Select Information Systems, I however, released its TeachM course at the show. This disk teaches the operator all the ins and outs of CP/M, one of the Disk Operating Systems I have not played around with.

When I got my hands on CP/M quite some time ago I took one look at the manuals which came with it, Took probably an unjustified dislike to the letters and style of writing, and put it aside. Sometimes one cannot be bothered to read the manuals, so CP/M gathered dust on the shelves.

When I got the chance to try Teach/M I did this with very little knowledge of CP/M. All one had to do was to insert the

disk, close the disk door and you are off to your first lesson. There are ways and ways of teaching people something. Teach/M appealed to me because it took nothing for granted and only explained one command at the time.

You read one or two lines on the screen regarding the command. The screen will then show you a sample of the command format. With this format in front of you, you type it in yourself. When and wherever possible the computer will carry out the command as you typed it in. Next you are asked to do this without any assistance; if you do so correctly the command will execute. However, if you make a mistake, it is suggested that you do it again and you have a choice to bring the prompt lines back to the screen again.

You can also retype the command for another go; until you do everything correctly the program keeps on suggesting that you go back and have another try. You can continue as you wish to next command, or discontinue altogether.

This method of teaching appealed to me and I'm sure there is a great future for this type of program.

The Faire is also a great outlet for the magazines, and there were dozens of them, new ones and old ones. You can divide them roughly into two groups: magazines devoted to a particular computer, and the general ones.

The product-supporting group had most newcomers. From memory there were three magazines supporting TRS-80, two for Apple, two started for the IBM, two started for Atari, and one for North-Star.

There was quite a large representation from the Californian educational institutions, some of them openly competing with private enterprise selling publications, programs and even memory boards.

All aspects of the industry were represented at the Faire; an association for program writers, hobby groups, groups of



people specialising in fields like medicine, education, engineering and so on.

Another important section of the Faire was the lectures one could attend. For some lectures you must register and pay a fee, for others you can just wonder in and out as you please.

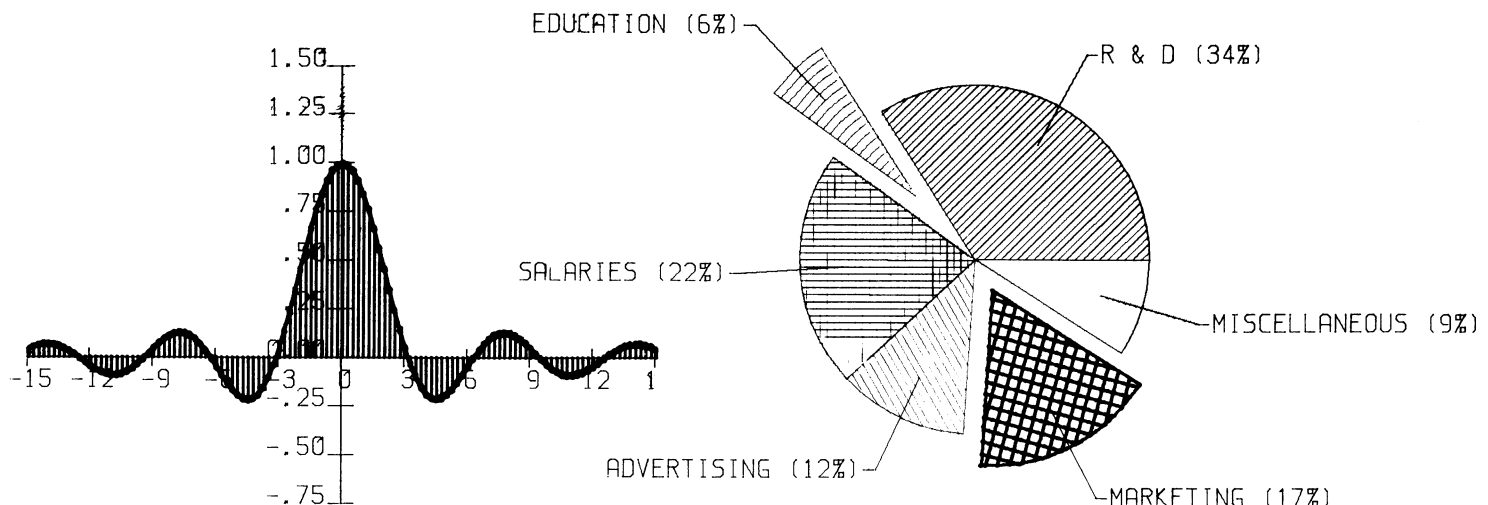
The subjects ranged from software piracy to "How to leave and compete with your Employer without getting sued" to "Microcomputer Application in Academic Medicine".

The show is masterminded by a character called Jim Warren. The nearest I

have come to him is by nearly getting run over by him on his roller skates: he travels that way, armed with a walkie talkie and is quickly on scene at trouble spots.

Warren and his team are full-time Faire organisers; they also run shows in other cities.

The San Francisco Show is their big effort every year. Anyone with any interest in the Computer world will find something to his liking at the Computer Faire.



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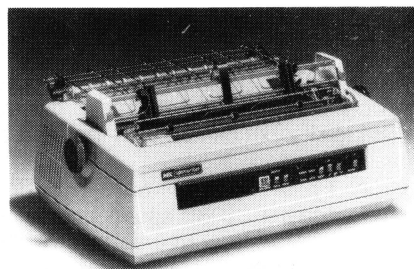
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SILVER NEC 513

New Magic for the Sorcerer

By George Lindley

THE EXIDY Sorcerer's operating ease and capacity is nicely enhanced by two upgrade kits that can be user-installed at reasonable cost.

Sold by Creative Software (PO Box 144, Doncaster 3108), each kit contains two EPROMs, programmed to give the instrument a range of facilities not extant in the original design, and to amend certain design errors in the monitor.

One conversion treats the monitor, while the other concerns the plug-in BASIC ROM-Pac. Creative will make the changes for those willing to ship the instrument back and forth, but that can be the proverbial pain. The kits obviate such fuss — even the user whose electronics skill is limited to good soldering techniques can easily do the work, and save some money too.

With the monitor converted, CLEAR no longer produces a syntax error upon the next entry, and the RUN/STOP key works properly. REST may be made without ruining a program, and the monitor entered without typing BYE. The monitor can even accept most lower-case commands.

A memory-search in either hex or ASCII can be made, including the use of wildcards (unknown bytes in a sequence of known bytes). Such searched (or the entire screen) can be printed out upon demand.

All RAM, graphics area included, can be quickly cleared. If a machine-code program is to contain alphanumeric text, merely type in the characters and they'll be automatically encoded into ASCII, a feature that can be an enormous time-saver. Memory contents can be displayed in hex and ASCII simultaneously. Hence, any alphanumerics in memory can be read out directly.

Printer commands (ON/OFF) are available, as is a CHRIN (character-in) function. Original monitor commands such as Batch and Memory-Test have been omitted from the EPROM programming to fit in all of the newer, more useful ones.

On start-up, the top of RAM for a given Sorcerer contains 00H. This lets the monitor revisions be active. The user can lock them out by entering a non-zero byte into that address.

The conversions are compatible, and the ROM-PAC mod serves standard BASIC, Versions 1.0 and 1.1.

For the BASIC Programmer

The BASIC ROM-PAC conversion yields the more common editing functions, such as character insertion and deletion, auto line numbering and line truncation — all as intrinsic commands, the way Exidy should have made them (line re-numbering is not included, but it can be loaded in from a utility tape furnished with the kit).

Other new, intrinsic features include token string search, selective line-listing, program recovery after, say, an accidental reset, block deletion of lines, saving and loading numeric arrays and the auto-execution of BASIC programs (if standard BASIC, Vers 1.1 is used).

Couple an audio amplifier to the parallel output port and the user alarm announces Sorcerer's moments of idleness, when the prompt is displayed. A program can also ring the bell (the new prompt, by the way, is "HELLO").

Using the tape utility, one can find a program line's address, delete useless spaces, merge programs from tape, and execute monitor commands from BASIC.

Easy Installation

The installation instructions supplied with each kit are unambiguous and essentially complete, with the work straightforward and free from pitfalls.

To convert the monitor, the main circuit board is lifted from the case to allow the removal of the ROM-Pac holder, under which are the monitor IC sockets. The instructions show which circuit traces to cut, and where to put the few jumpers and the EPROMs. With its engine-room restored, the Sorcerer is ready for duty.

The small power supply board atop the rear of the main board remains mounted on it as the latter is lifted out of the case. The transformer's secondary leads are merely unplugged from the supply pcb first (is the power off?)

The top cover of the case is only lifted high enough to expose the ribbon cable connecting the keyboard to the main board below, and the orientation of the cable's plug and mating socket noted. Things can get reversed during re-assembly and, if the cover is raised too high, the plug pulls out before its position can be seen.

The BASIC ROM-Pac conversion is even easier. However, the instruction

sheet fails to reveal the secret of how to separate the Pac's plastic casing so that the Sorcerer surgeon can go in and do his work on the small pcb inside.

There are five holes in the side of the case opposite the paper label. Into each, a notched plastic pin is hooked. Starting with the two holes nearest the case's open slot, a pocket screwdriver is used to push the pins towards the slot. The seam around the case's edges is eased open with one's third hand (no real force is required to ensure success here!).

With the PAC open, the position of the pcb is noted, as it can be wrongly inverted later. As before, only a little cutting and jumpering is required. The ICs are replaced, and the case halves snapped back together.

The total time for both conversions should be around two hours or less. Tools needed are a Phillips screwdriver, a knife to cut the traces, and a small iron (15-25 watts). Very highly recommended for all such work is a 20-power jeweller's loupe to really see solder joints.

Well Worth It

The Monitor Upgrade Kit costs \$59.50; the BASIC ROM-Pac Upgrade Kit is \$69.50 (user-installed prices, with postage paid).

The instruction sheets describing Sorcerer's new operations are adequate, but they should have been supplied in booklet form for greater longevity. The author noted only one operational flaw which, when allowed for, is no real Greek tragedy: When using the monitor's new routine to search past memory location 00FFH, the contents of that memory were altered.

The source files loaded from the taped utility can be awkward to call upon. A "GO 100" is entered to get the menu and, after a file is used, an autoreturn to BASIC is made. Yet one often needs to use a file repeatedly, and each time it means a "GO 100" again. One aspect of the line re-numbering facility (block re-numbering) did not work at all on the author's conversion. Not a calamity, but . . .

The original ICs and the new installation sheets should be saved so that, if one of the new EPROMs ever fails, the original design can be regained if desired. □

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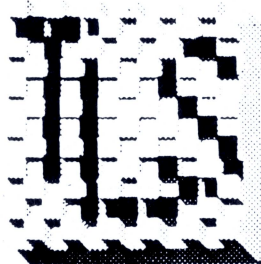
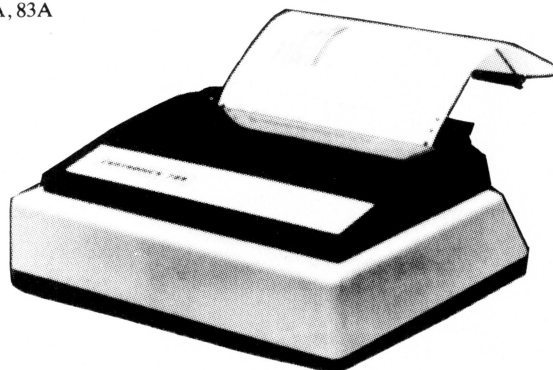
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0024      02 REC1 PIC IS X(156).
0025      02 SEQ2 PIC 9999.
0026 WORKING-STORAGE SECTION.
0027 01 OUT-FILE-NAME PIC X(14)
0028      VALUE "B:RANDFILE.DAT".
0029 01 X1 PIC 9999
0030      VALUE 0001.
0031 PROCEDURE DIVISION.
0032 BEGIN.
0033      DISPLAY "Enter output file name: ".
0034      DISPLAY OUT-FILE-NAME WITH NO ADVANCING.
0035      ACCEPT OUT-FILE-NAME.
0036      OPEN OUTPUT FILE1.
0037      MOVE SPACES TO O-RECORD.
0038 BEGIN2.
0039      MOVE X1 TO SEQ.
0040      MOVE X1 TO SEQ2.
0041      ADD 1 TO X1.
0042      DISPLAY O-RECORD.
0043      WRITE O-RECORD.
0044      IF X1 IS = TO 201
0045          GO TO EOJ.
0046      GO TO BEGIN2.
0047 EOJ.
0048      CLOSE FILE1.
0049      STOP RUN.
0050 END PROGRAM WRITEFILE.

```

Figure 1 shows a short COBOL program, which simply writes 200 records to disk, creating a random access file. Note that although the organization and access mode are given as sequential in the program, this does not preclude random access by other programs as the record length is fixed.

The program starts off with the identification division, and then leads into the environment division. The compiler isn't going to do much if you claim your program is intended to compile on a Flugelstein Computer Works Q001 computer; it's there for the programmer's information.

The file control section performs a similar function to a group of BASIC's OPEN statements (except it doesn't actually open the files). In conjunction with the file

section of the data division (which is rather like BASIC's FIELD statement), this describes the file structure of FILE1, and says what the record length and fields will be.

The file section also allocates the fields of the output record, in the section beginning 01 O-RECORD. This sets up field SEQ to contain 4 digits, REC1 to be 156 characters of alphanumeric information, and SEQ2 as 4 digits.

The working storage section declares and initialises the variables used in the program: OUT-FILE-NAME is set to be B:RANDFILE.DAT and X1 is initialised to

1.

The procedure division, as discussed above, is the program proper. We don't know what to say about it: it's so self-explanatory it's not funny.

A couple of points are worth mentioning, though. Line 0035, DISPLAY OUT-FILE-NAME WITH NO ADVANCING. is equivalent to the BASIC line PRINT OUT-FILE\$;. ACCEPT OUT-FILE-NAME. will input a string value to that variable, but if only carriage return is depressed, it will retain the existing value. This very neatly allows default file names to be supplied by the program.



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Nevada Cobol

Despite the enormous popularity of BASIC and the growth of personal computers, most programs are still written in that hardy perennial, COBOL. Here's an interesting version for micros...

WAY BACK in the 50's (remember?) the US Department of Defence and other government departments experienced a computer explosion. Transistorised computers were making their mark, but the big problem lay in the huge number of languages that were starting to appear.

At that time, we knew a lot less about language design — BASIC was just a glimmer in the eyes of Kemeny and Kurtz — and every manufacturer designed new languages to take advantage of the new whiz-bang features of each new computer (incidentally, much the same thing is in danger of happening today with whiz-bang graphics and sound on personal computers).

The result was chaos with a capital K. To reduce the problem, the DOD's technical people proposed that manufacturers should support a common language, and set about designing that language. The result, after several iterations, was recognisable as the COBOL we know and love(?) today.

We wouldn't say COBOL was fool-proof, because someone would take offence; nor would we say it seems to be designed down to meet the lowest common denominator of commercial programmers, because someone would hit one of us (probably the lowest common denominator).

On the other hand, many of the readers of this magazine are programmers by inclination, because they enjoy it, and would have little idea of the different world inhabited by programmers in large commercial installations.

In that world, each program is worked on, modified and maintained, throughout its life, by an average of *ten* different programmers. The programs are large, and operate on large files. Many programs will originally be written by a team of several programmers and analysts, and will not reflect the style or approach of any individual.

Tricky or sophisticated programming has only a limited place in this world. A program written by a hot-shot could cause horrendous problems for the average

your computer

SOFTWARE REVIEW

programmer who has to maintain it next, so programs should work in obvious and easily comprehensible ways.

To assist in this, all programs have to be documented with annotated listings, flowcharts, operator manuals, maintenance manuals and a whole mass of other paperwork which most programmers regard as a waste of time and resent doing.

Plus, there are pressures to produce, to be accurate and effective — all accompanied by the inevitable honest-to-god mistakes, re-runs of screwed batches, and not being able to get time at a terminal to compile and test that program that was due out yesterday.

Most personal computer programmers are hot-house plants that wouldn't last a day in that world before screaming in frustration. It takes a special breed to churn out good software in that kind of environment.

In the midst of all this, COBOL works well. It's a batch-oriented, paper-and-pencil language; you write your program in your office, far away from a terminal, and once you've written it on the special coding forms, these are sent to be key-punched and compiled.

Sample runs of the program are returned first thing in the morning. Sometimes the program has screwed royally, and you have to debug it with the aid of an Abend dump, which is a printer listing of the contents of memory when your program was aborted. Other times, strategically printed variable values will let you know what's going on.

Frankly, it's a bloody miracle some programs run at all!

The Language

COBOL is a basically simple language, based on English words. A program is made up of four **divisions**, each containing specific information.

First comes the **identification division**, which contains the program name and author.

Next is the **environment division**, which consists of two sections called the **configuration section** and the **input-output section**. The configuration section says which computer the program was compiled on, and which computer it will run on, while the input-output section, which can contain several **paragraphs**, generally describes the files used by a program.

The **SELECT** statement tells the computer what device the file will be on. Although when COBOL was first designed the devices included card readers, line printers, magnetic tape and drums, most microcomputers will only be equipped with floppy disks.

After the environment division comes the data division. Here all variables are declared — file variables first, followed by the program's working variables. COBOL uses picture statements to define the number of digits in a variable, whether it is numeric or alphanumeric, and so on.

Finally, the procedure division contains the program itself. The most noticeable thing about a COBOL program is its ease of understanding. Everything is spelt out, with almost no possibility of misunderstanding.

```
0001 IDENTIFICATION DIVISION.
0002 PROGRAM-ID. WRITEFILE.
0003*CREATES A FILE OF FIXED LENGTH RECORDS
0004 ENVIRONMENT DIVISION.
0005 CONFIGURATION SECTION.
0006 SOURCE-COMPUTER.
0007     8085-CPU.
0008 OBJECT-COMPUTER.
0009     8085-CPU.
0010 INPUT-OUTPUT SECTION.
0011 FILE-CONTROL.
0012     SELECT FILE1 ASSIGN TO DISK
0013     ORGANIZATION IS SEQUENTIAL
0014     ACCESS MODE IS SEQUENTIAL.
0015 DATA DIVISION.
0016 FILE SECTION.
0017 FD FILE1
0018     LABEL RECORDS ARE STANDARD
0019     VALUE OF FILE-ID IS OUT-FILE-NAME
0020     BLOCK CONTAINS 1 RECORD
0021     DATA RECORDS ARE 0-RECORD.
0022 01 0-RECORD.
0023     02 SEQ PIC 9999.
```

Specifications and Report Card

Unit:	Nevada COBOL
Made By:	Ellis Computing.
Useful for:	Commercial Programming
Hardware Req'd	8080/85/Z-80, running CP/M

Ratings:	excellent	good	well, maybe	poor
Documentation:		✓		
Ease of Use:	✓			
Functionality	✓			
Support:	✓			
Value-for-money:	✓			
Extras Included:	Applications software book			
Options:	Disks of software			
Review Unit from:	Archives Computer Services, Qld			

ACCEPT and DISPLAY are roughly equivalent to BASIC's INPUT and PRINT, and are extensions to the original COBOL standard to allow user interaction via screen and keyboard.

Nevada COBOL

Nevada COBOL surprised us. It is fast. We used the RENUMBER utility to add line numbers to a program, and it read the file, renumbered the program and wrote it out to disk again about as fast as TYPE could later list it!

The compiler itself is a multi-overlay two pass compiler, and is also pretty quick. We had thought the compiler would drag

along, wading through all that source code, but it zipped through; it was probably the fastest thing we've seen since BDS C.

The compiler generates threaded native code for the 8080 microprocessor, which is loaded with a run-time loader and support package.

Despite its low price, Nevada COBOL is a fairly useful (and complete) subset of ANSI-74 COBOL. The full language has more reserved words than anyone can possibly remember, so that most programmers probably work with a favoured subset which is pretty close to Nevada's anyway.

It includes conditional compilation of debugging statements, the copy statement for library handling, hex non-numeric literals, the record description elements PICTURE, PIC, REDEFINES, VALUE, FILLER, SYNC, USAGE, OCCURS, the picture characters A X 9 B O / V Z, . * + - \$ CR DB, interactive ACCEPT/DISPLAY and other useful features.

Files can be random or sequential, with fixed or variable length records. Up to 12 files can be open concurrently.

To support Nevada COBOL, there is an applications software book which shows several applications, including budget planning, personal financial reporting, a precobol macro processor (written in COBOL?) and labeller.

A bonus for software developers is the Ellis Computing policy of allowing free distribution of its run-time package with distributed object code.

Our feelings previously had been that languages vary along a line of applicability. At the one end are languages that kill the programmer and are easy on the machine, at the other end are those that are easy on the programmer and hard on the machine.

We've had to change our minds about where COBOL sits on that line. The Nevada COBOL compiler generates quick code, and the language is simple and easy to use.

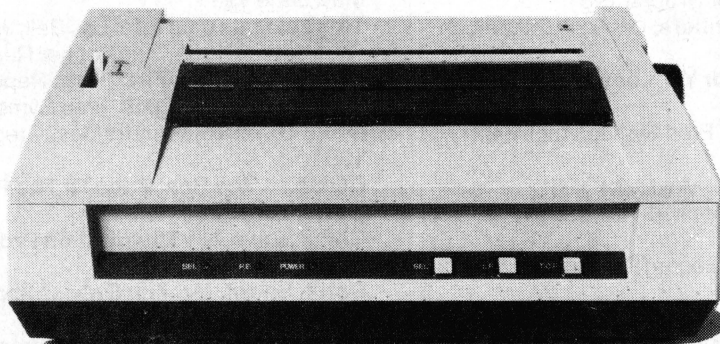
If you want a custom package written by a commercial programmer, this may be the language he should use. Already, because of Nevada's fast disk I/O, we're wishing we hadn't used Pascal for one particular project!

Versions of Nevada COBOL are available for use with CP/M, PTDOS and TRS-80 Model 1 CP/M. Our review copy was supplied by Archive Computer Services, of Brisbane. □

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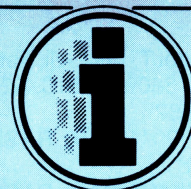
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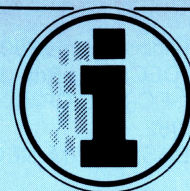
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NEC PC-8001, Z80, BASIC CP/M, NEC's Next, Les Bell, Sept/Oct 1981
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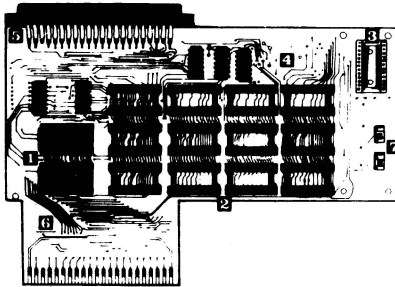


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THE RANGE of Apple games is rapidly expanding, so I've tried to review as many as I can this month.

Even if I am enthusiastic about a game I might not purchase it myself — it may be similar to one I already have.

My purpose in reviewing them is to give you an idea of what's on offer, and I do try to forget about games I already have and look at each new one individually.

Home Business

One program that seems to have been overlooked by us in Australia is the Personal Finance Manager program put out by Apple Computer through its Special Delivery Software label.

PFM is a home budget program that allows for up to 200 entries in a year — in effect, a mini cash-book program. I have used it ever since it became available at Christmas time.

It allows you to keep detailed information on all cheque transactions, deposits, cash and credit card expenditure.

One of its powerful features is the ability to set a budget at the beginning of the year. As you spend money the program can indicate whether or not you have exceeded your budget and if so in what areas.

If you cannot allocate further funds to cover these budget excesses you can then cut back spending in other categories.

A graphical display of budget activity is possible with month-to-date and year-to-date expenditure summaries. These summaries are expressed as a percentage as well as an actual figure.

If you have any doubt about whether or not you have made an entry, paid a bill or whatever you can sort and search all data by month, entry type, budget category, amount, cheque number or whether or not you have earmarked the entry as a tax-deductible item.

This last feature is a particularly helpful one on its own, as you can print out a full report of all claimable expenditure.

All data is able to be backed up and two disks are supplied. A 48K single drive system is all you need. Price is around \$75.

War Gaming

Strategic Simulations has released three new games for the Apple — pursuit of the Graf Spee, The Road to Gettysburg, and Shattered Alliance.

The latter is currently available in Australia for \$62.50, while the others are expected to retail for about the same.



Greg Stringer and Greg Willey are reviewing the first two, and we hope to have an extensive review for the next issue. Preliminary opinions, for those who can't wait, are good.

More Wizardry...And Mazes

The second scenario of this fantastic game, called Knight of Diamonds, has been released in the United States.

To quote the advertisements: 'Barbarians gather, preparing to sack the city of Llylgamyn. News that the mighty staff of Gniida has been reclaimed by its earthgod creator has travelled fast. Protected for a thousand years by the power of the wondrous artifact, and now defenceless, Llylgamyn is doomed, unless you can help!'

An in-depth review will be on the way once a copy has been secured.

Another new one, Microwave is a maze game with a difference. In it you have to move through a maze to collect various items such as wrenches, powerpacks, knives and so on. Your goal is to collect all items — at which time you can then proceed to the stairs for the next level.

The longer you take to collect these items the greater the risk of you being caught by the monsters who are multiplying. Capture, need I remind you, means instant death.

During the whole escapade there are musical routines which are very effective. When you come down to the last man and the monsters are closing in on you it's reminiscent of an old silent movie during a chase.

The more powerpacks you pickup the more Microwave beams you can set up to destroy the monsters or stop them following you. Apart from the monsters, you are advised to avoid the unexploded bombs — represented by hand grenades.

Microwave has a joystick option. Another thing I liked was the fact that

Microwave was not too difficult to start with — there is nothing worse than playing a game which destroys your confidence in the first 10 seconds (yes, I'm a poor loser!).

Labyrinth is a variation of Hyperhead On and Jawbreaker mixed with Crossfire. As in Hyperhead On you can gain points by moving around the board crossing over the small dots in the various mazes. Your goal is finding and freeing four humans trapped in rooms of the maze.

From an overview you can see all of the maze and by either the keyboard or joystick you direct the blue diamond around the maze. After you release the four men trapped an X appears on the far side of the maze; if you reach this point you descend to the next level.

You have three lives and a limited amount of firepower; you need it all. From the centre of the maze spring all sorts of undesirables such as Trappers, Scourges, and maybe a Minotaur or two.

Your mission is also to stop these aggressive individuals from destroying you. If you are successful in destroying one of them you will be rewarded by the great war god with an extra two missiles (the strong always get stronger).

As further testimony to the capitalist principle, as you get to another level you are also awarded an extra life. You will need it.

The Snake Bytes!

In Snakebyte you control a snake that meanders around the screen. The object is to eat all the Apples, without running into yourself — and as the snake consumes more Apples it gets longer.

A good one for the kids, but not for me.

Another one for the younger members of the Apple family, being both educational and entertaining, is Duelling Digits — a superb game by Broderbund.

The aim of the game is to shoot the numbers (or operands) that are constantly changing on the screen. After you successfully score a hit the 'victim' is yours.

You have to then take the number to the bottom of the screen, where you deposit it on a line — and finally you have to use the numbers to create an equation that must be true (for example, $34 \times 4 = 136$, or $235 + 34 - 5 = 264$).

If you complete the equation successfully you are given a score; if not, you start again.

The challenge is that you have to play against a partner (or the computer) who is also building up his score. Time is of the essence, so it is extremely useful as a

teaching aid.

Finally there is also the problem of being shot at by the opposition — he scores ten points for each hit! Each of you has ten lives.

Conflicts And Soft Talkers

Prolific war-gamer Roger Keating, who writes locally for the international market, is at it again (he must have been a Napoleon in a past lifetime).

Roger showed me a copy of his new war game (it's now two he's working on) — he spent a day and a half developing it, but it will take another two to three months to polish it up for release! It's a one- or two-player game.

The biggest feature is that it is easy to learn the rules and play, yet the more you play the better your strategy will be. It looks like it will be a good one.

Imagineering is now importing Softtalk magazine and distributing it to dealers. It

is worthwhile grabbing a copy, as it has some excellent software reviews.

Rotten Apples

It never ceases to amaze me how owners of other computers constantly have to find faults with the Apple and ignore the failings of their own equipment (including one-eyed cats).

As owners we know more about its faults than anyone else as we have to live with them or learn how to get around them. Maybe it's the old Australian concept of knocking anything or anyone who is on the top (insecurity).

I remember one person criticising it by saying that the only good thing about the Apple was its software, expandability, and public acceptance!

Maybe Apple is 'the standard by which all others are judged'.

Peter Who?

Finally, my cover has been blown — so

now I can have my picture in the magazine (the image is courtesy of the guys at Computerland).

Imagineering has indicated my association with City Personal Computers by nominating me and CPC as dealer of the month.

For those who might ask, I'll say it first. While I have acknowledged CPC in some of my reviews it is only because I have borrowed products from the company to review. It also gets demo copies of software before the release (like Duelling Digits) which helps me keep up to date.

Other vendors are more than welcome to send me copies to review. Hopefully I will also receive copies direct from the American software houses like Strategic Simulations has done (this is a strong hint to Gary Carlston of Broderbund!).

On the public side, any suggestions or hints or tips that I can include or act upon (except jumping) will be welcome. □

Colouring The Apple

ONE THING that has always bothered us about the office Apple is the price of peripherals — you can spend more filling the eight expansion slots than on buying the machine itself.

It's clever marketing (something like picking up on the roundabout as well as the swings), but can be dispiriting for the new owner who thought his pride and joy could do everything.

It can be even more dispiriting when you find that Apple's parts list (locally, at least) refuses to record anything under \$200, especially when some of the items are less than the ideal. The Apple communications card is a perfect example; you can't get an intelligent communications program to run with it because there isn't an error register, and to change baud rates you have to make a hardware modification.

Most owners find out California Computer Systems' similarly priced card has all the missing features — after they've run into problems with the Apple card . . .

It's left to the aftermarket manufacturers to fill the gap, and fortunately they do, as the competition is bringing prices into line. Apple owners must cringe when they see some of the advertisements in American magazines, however, as that level of competitiveness hasn't been

seen here.

They can relax. The local influx has started. Surprisingly, though, it isn't American but British gear that is stirring the local market.

Imagineering, probably Australia's largest independent importer of Apple software and peripherals, has launched the Digitek line of expander cards at prices that, for once, seem entirely reasonable.

Digitek's 16K RAM card sells for \$112, its serial interface for \$135 and its parallel interface for \$136. It has a Z80 card for an amazing \$149, although we're a bit wary of the implications of that one — it comes without the CP/M operating system.

We've just tried the PAL card which, at \$145, would make the official Apple card look uninviting even before you realised the Digitek's output was noticeably better.

The low price isn't a result of corner-cutting, either — one of the first things you notice when you start unpacking these cards is the constructional quality. The boards are neat and well put together, with socketed chips, and the whole thing is carefully packaged with a quality manual detailing installation instructions.

It is easily installed in a matter of minutes, although we do advise you to read the instructions carefully — if you connect the video input the wrong way around, you can do some damage to the Apple's video circuitry.

It has an RF modulator on-board so you can plug straight into the family television, run direct video to a monitor, or both.

—Matt Whelan



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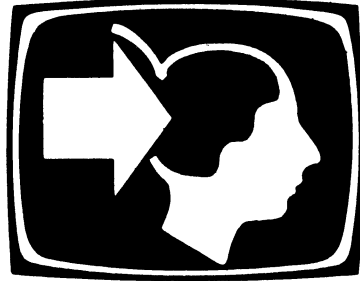
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Understanding Assembler — Part V

After a brief digression to talk about communications programs, this month Les returns to more general applications, such as memory fills, block moves and searches. . .

AS YOU come to write more and more assembly language programs, you will generally find there are certain building blocks that occur again and again.

These include filling a block of memory with a particular byte or pattern, moving a block of memory from one location to another, and searching for a particular word.

Filling memory

Filling memory with a pattern has many uses. For example, many computers, such as the TRS-80, MicroBee and so on have memory-mapped video: that is, the contents of a block of the computer's memory are displayed on the screen. Clearing the screen is a matter of writing spaces into every location of the video RAM.

This is done by loading the character to be written into the accumulator and then using the MOV M,A instruction to repeatedly write it to memory. For example:

; Block fill routine

;

org 0100h

start equ 0f000h ;start of block
finish equ 0f07fh ;end of block
char equ 20h ;char to fill

fill: lxi h,start ;h <- start of block
lxr d,finish+1

loop: mvi a,char
mov m,a ;store it

```
inx h ;point to next location
mov a,e
cp l
jnz loop ;not equal, keep looping
mov a,d
cp h
jnz loop ;not equal, keep looping
ret
```

When assembled, the code looks like this:

```
          ; BLOCK FILL ROUTINE
          ;
0100          ORG      0100H

F000 =      START EQU 0F000H ;START OF BLOCK
F07F =      FINISH EQU 0F07FH ;END OF BLOCK
0020 =      CHAR EQU 20H ;CHAR TO FILL

0100 2100F0  FILL: LXI  H,START ;H <- START OF B
0103 1180F0          LXI  D,FINISH+1
0106 3E20      LOOP: MVI  A,CHAR
0108 77          MOV   M,A ;STORE IT
0109 23          INX   H ;POINT TO NEXT L
010A 7B          MOV   A,E
010B BD          CMP   L
010C C20601      JNZ   LOOP ;NOT EQUAL, KEEP
010F 7A          MOV   A,D
0110 BC          CMP   H
0111 C20601      JNZ   LOOP ;NOT EQUAL, KEEP
0114 C9          RET

0115          END
```

This version is ORG'ed at 0100H to suit a CP/M system, but others will place it wherever convenient. In practice, however, this routine will probably form part of a larger program and will be called as a subroutine.

An alternative approach is needed when you know the start of the block to be filled, and its length:

```
; Block fill routine version 2
;
; org      0100h

start equ 0f000h    ;start of block
length equ 80h      ;length of block
char equ 20h        ;char to fill

fill: lxi h,start    ;h <- start of block
      lxi d,length
loop: mvi a,char
      mov m,a        ;store it
      inx h          ;point to next location
      dcx d          ;decrement de
      mov a,e
      ora d
      jnz loop       ;de not zero, keep looping
      ret
```

Note this version is rather shorter than the first, largely because of the elimination of the compare instructions. In this case, we load DE with the length of the block to be moved, and count down from that value to zero.

The test for zero is accomplished with just two instructions (mov a,e and ora d), which will leave the zero flag set if both d and e are zero.

Block fills will work considerably faster if the transfer takes place to a 256 byte boundary, particularly if the block length is 256 bytes.

In this case, one need only start the fill with HL set to xx00, and increment it until L is 00 again.

```
; Block fill routine, 256 byte block
;
; org      0100h

start equ 0f000h    ;start of block
char equ 20h        ;char to fill

fill: lxi h,start    ;h <- start of block
loop: mvi a,char
      mov m,a        ;store it
      inx h          ;point to next location
      mov a,l
      ora a
      jnz loop       ;L not zero, keep looping
      ret
```

Similar techniques can be applied to block fills of other lengths.

Block Moves

Block moves are a little more complex than block fills. In the case of a block move, one usually knows either the beginning and end of the source area, and the beginning of the destination,

or the beginning of the source and destination, and the length of the transfer.

For the first case, here's a possible solution:

```
;block mover

; org      0100h

soubeg equ 0120h    ;beginning of source area
souend equ 0130h    ;end of source area
dest equ 0f000h     ;beginning of destination

move: lxi h,dest
      lxi d,soubeg
      lxi b,souend

loop: ldax d        ;get character
      mov m,a       ;store in memory
      inx d         ;increment d
      inx h         ;and h
      mov a,e       ;compare bc to de
      cmp c
      jnz loop
      mov a,d
      cmp b
      jnz loop
      ret
```

This version will move any length of block to any non-overlapping destination.

If moving a 256 byte block of data up one byte, for example, then the block move should start with the last source byte and move it to the end of the destination area, then move downwards through memory from there. A little paper-and-pencil experiment will reveal why.

If the length of the block is known, life can be made a little easier:

```
;block mover, where block length is known

; org      0100h

source equ 0120h    ;beginning of source area
dest equ 0f000h     ;beginning of destination
length equ 20h      ;length of block

move: lxi h,dest
      lxi d,source
      lxi b,length

loop: ldax d        ;get character
      mov m,a
      inx d
      inx h
      dcx b
      mov a,c
      ora b
      jnz loop
      ret

org source
db 'The quick brown fox jumps over the lazy dog.'
```

This uses the same trick to compare bc for zero as was used in the earlier block fill routine.

A common requirement is to move 128 bytes of data. This is

and the PET inventor, Chuck Peddle, is going well for Commodore. Poor Chuck had to return \$4 million worth of shares. It must be getting Sirius.

Some Commodore well wishers sent me the enclosed letter:

Dear Sirs, here are some useful tips for Tandy computer users — Sandringham Tip, St Kilda Tip, Lower Plenty Tip and Frankston Tip. Signed, Peter Pot.

Some people have a strange sense of humour.

I've recently been given some goodies to examine by people who help to make the Commodore product even better for you, the user.

PETDISK II

John Guidice of The Microcomputer House in Sydney imports the PETDISK Series. PETDISKS come in a variety of sizes from the 540 13cm single drive, single sided, double density 143K unit to the 877 dual drive with 590K using 20cm floppy disks. I had the 540 model to play with.

The first surprising point upon unpacking a PETDISK is how light and compact the unit is. The second is the manual, which is very explicit and intelligently written.

First, you have to install the plug-in interface to get your disk operating system. This does not interfere with any feature of your Commodore. You remove one of the BASIC ROM Chips and place it in the interface board. Then you position four wires with clips into place, plug the interface into the empty ROM socket and you're off.

The operating system uses 2K of your computer's memory and you can have up to three drives hooked on simultaneously.

The system disk must be in Drive 0 when you start up; a simple SYS command activates it. You have a choice of two command sets — the BASIC set uses load, save and so on with each command preceded by an exclamation mark, while the other set is the machine language monitor DOS.

The PETDISK supports relative, sequential and index sequential files. You can also make backups easily even with just the one drive unit. The copy disk utility lets you specify Drive 0 as both the source and destination drive. The computer loads the disk into memory, then writes it back once you've inserted your new disk.

I guess the most amazing feature of the

PETDISK is its speed. We ran a little test, timing how fast it would save 64K of data.

The PETDISK did it in 5.6 seconds — compared to 90 seconds on the Commodore 8050 IBM drive and just over six seconds on our 12 megabyte Winchester Hard Disk!

It's fast because the PETDISK doesn't have to go through the IEEE port — it loads directly into memory. The format is IBM and that, in a vague way, is its only downer because it does not support Commodore-written software.

I was skeptical when John gave me the PETDISK, having been biased towards the Commodore 2031 single drive. Boy, did I get a surprise. The PETDISK is ideal for the hobbyist, and it's cheap. So ring John Guidice on (02) 699 6797 or talk to your local Commodore dealer.

VIC Software

Your favourite magazine sent me some VIC software to peruse which made a potentially dull weekend into a fun one.

The seven games and the one application program came from VIC Soft in Gosnells, WA. I believe VIC Soft has about 100 titles on cassette — haven't they been busy bees! I'll make a brief synopsis of the ones I saw.

Seawolf: Is a 'shoot-em-up' game. You, the submarine, try to sink all the battle ships that go across the screen. Someone commented that they might like to change the name to 'Falkland Islands'.

Minefield: Written in BASIC, is a game of logic. By following the computer's clues, you stealthily pick your way from one end to the other of a highly flammable minefield.

Super Lander: Is not as the Commodore VIC cartridge but more like Lunar Lander. You have to guide your craft into a number of landing areas.

City Bombers: Uses some clever graphics. The object is to flatten a city with bombs before you collide with the tallest building.

VIC Trap: Is like Wrap Trap but assumes you have a joystick which I didn't so I couldn't play it.

Alien Blitz: Is a cleverly written machine code Space Invaders. I say clever because the writers fit it into 3.5K.

VIC Cube: A Rubic's Cube simulator. I haven't mastered the original yet so had no success here. I enjoyed trying.

ViCalc: This calculator program gives a number of memory spaces which can be displayed simultaneously. By using vari-

ous commands, you can quite easily do reasonably complicated calculations such as compound interest and mortgage.

ViCalc was the only program with an Instruction Book. However, you don't really need one with the others. All the programs loaded up first time — a pleasant change.

The games all use the VIC's colour and graphics to full effect and I was well pleased with my entertainment. Pity I had to send them back. I guess I'll just have to buy my own.

The Programmer's Toolkit

Someone thought I needed some help with my programming.

I've come a long way from the days when my first program consisted of PRINT "HELLO FRED" x 10. The intended result was ten lines of HELLO FRED, instead I got a zero. I had better luck with a 'for=1to10' and a 'next' statement. But gees, it's a drag feretting through all those syntax errors, renumbering the lines, finding a string, and so on.

It was my birthday in April (I was one year old), so I got a programmer's toolkit. I might have preferred some fresh fish but it's been very therapeutic using the extra 10 commands my toolkit gives me.

I now have at my fingertips AUTO, DELETE, RENUMBER, APPEND, DUMP, FIND, STEP, OFF, HELP and TRACE. The toolkit fits snugly into an empty Commodore ROM socket and is enlivened by a SYS command.

My programs have definitely improved in content and speed and so should yours, regardless of what type of PET you have. The programmer's toolkit should be available from your local Commodore dealer.

More Catty Comments

Who has egg on its face? Yes, Commodore has done it again with a little power pack hang-up. There are some ropable dealers about!

As yet the sales tax folk are unresolved about software. Seems some enterprising computer people confused them with technical jargon after they recently claimed all off-the-shelf software was always subject to 17.5 percent tax. The matter is being referred to Canberra — we respectfully await their deliberations.

Who said Commodore dealers were mundane? One Tasmanian is a candidate for the State Parliament. It just goes to prove that all politicians are salesmen at heart.

your TI 99/4 computer

By Shane Andersen



WITH THE TI99/4A computer soon to be released in Australia (hopefully late June), the users' groups have decided to conduct a nation-wide incentive program to get more software for Australian users.

As of the June 1, we are conducting our members' 1982 National Software Awards.

Every entrant will be a winner, and will receive a diploma showing they contributed software for this event. Plus the winners of the three sections will receive a number of other prizes, and we will arrange to have their winning entries distributed commercially both in Australia and overseas.

The three sections are:

- Business Programs (such as record keeping, filing, personal finances, home management).
- Brain Games (educational/thought-provoking games).
- General Games (any type, such as/or similar to arcade games).

The judging will be done in Sydney in late October. The competition will close on the 10th of that month.

The judges (city co-ordinators) would envisage that better programs would use the full capabilities of both the 99/4 and 4A computers, like graphics, sound, speech, joysticks, and/or printer. Both TI-BASIC and Extended BASIC programs are acceptable.

The rules for this competition are:

- 1) Programs taking up all of the standard memory must have complete and understandable documentation, otherwise instructions are to be included into the program.
- 2) All programs should include REM statements (single line) stating briefly what each section of the program does.
- 3) Only TI-BASIC or Extended BASIC can be used for this particular competition, but the use of Pascal, Assembler, 108

logo or forth can possibly be used in next year's National Software Awards.

4) Software should be on either cassette or diskette, and should be accompanied with a printout of that program. If the author does not have a printer, he/she should contact their local city co-ordinators, who will provide them with such.

5) Everyone who is a member of the Australian network of 99/4 user groups may enter, and this includes the co-ordinators. However, during the judging, a co-ordinator shall not judge his or her own work.

6) Judges decisions are final, and no correspondence shall be entered into.

Application forms can either be obtained from each of the city co-ordinators, or from the national co-ordinator (yours truly), at PO Box KX101, Kings Cross, NSW 2011.

We are looking for a good response to the 1982 National Software Awards, and we believe it will be a good way to encourage our members to write programs.

Weight Control And Nutrition

I recently had the pleasure of sampling a new diet module for the 99/4 computer; in fact I thought I could really put this one to good use. With a body which is about a stone overweight, I set out to give this product a real going over.

This module (ROM pack), adds 30K of memory to the computer and works in conjunction with a printer which will provide you with a print-out of a diet covering three meals a day plus snacks, for a complete week (for the duration of the diet until the required weight is lost).

The computer asks for your name, sex, actual weight, date, target weight, target date, and then a huge variety of different kinds of foodstuffs are supplied for you to either say yay or nay to, depending on your taste — there must be about 100 different types of meals in six categories.

The computer will then tell you the recommended calorie consumption plus the target consumption.

The Weight Control and Nutrition program provided me with a complex daily diet, and the beautiful thing about this program is that you can eat just about everything you like, and the computer will tell you how much and how often you can have what you like, and still lose weight in the process.

The meals suggested by the program are nutritious, although they're not designed for those with special dietary requirements, and the recipes demand a

chef who is willing to venture into the unknown.

Fortunately the deviations from standard diet fare are pleasant. All in all, the program is easy to follow and average weight loss is about two pounds a week.

Diet data (how much weight is lost, new menus, and so on) is entered weekly and can be recorded on cassette or disk. Quick copies of the recipes and menus can be printed (for the refrigerator door, of course!).

This module retails for just under \$60 and is well worth the outlay. ☐

NAME: SHANE A.

SEX: M

ACTUAL WEIGHT: 187 LBS

DATE: 04/18/82

AGE: 33

HEIGHT: 5 FT 11 IN

TARGET WEIGHT: 177 LBS

TARGET DATE: 06/28/82

RECOMMENDED CONSUMPTION:
2393 CAL TO 2570 CAL

TARGET CONSUMPTION:
1981 CAL

ENERGY REQUIREMENT: SHANE A.

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TO REACH YOUR TARGET OF
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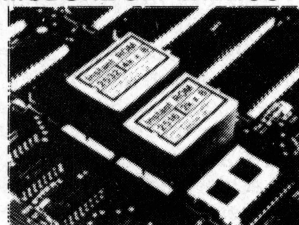


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I'VE BEEN stuck on my back in hospital for several days after an operation and I decided to use the time to review some of the computer text books that have influenced me over the years.

I pick up on a lot of good ideas that I'd forgotten but there was one outstanding one. Its from the book *Elements of Programming Style* by Kernighan and Plauger (McGraw-Hill), an excellent book but hard going if you don't understand FORTRAN or PL/I.

The book is a discussion of what makes good programming style and has many, many examples of both good and bad style.

One test the authors suggest can be applied to any code is the 'telephone test'. The basic premise is that if the code is clear and concise it should be easy to read out loud to someone else who is familiar with the programming language used.

Well, I decided to try out the 'telephone test' on some of my code. The results were interesting though hardly surprising in one respect.

I found that most of my assembler code was okay, most of my C code was also okay as was my CBASIC/CB80 code; however, the great proportion of code written in Microsoft BASIC failed the test badly, even when I had tried to write the MBASIC code in a reasonably structured way.

The next move was to attempt to rewrite the MBASIC code to make it pass the test but after spending a considerable amount of time I abandoned that experiment as a lost cause.

The conclusion: it seems clear to me that languages that truly support structured programming will 'lead' you into writing clearer code, even if you don't put a lot of conscious effort into it. Languages that inherently don't support structured coding techniques will tend to encourage sloppy programming.

MBASIC — Where To Next?

MBASIC has become the almost universal offering with most 8-bit microcomputer systems. It may be called TRSBASIC or Applesoft or whatever but deep down all the Microsoft-authored BASICs have a common heritage going back to the original Altair BASIC.

IBM has introduced its PC based on the 8086 family of microprocessors and several of the Japanese manufacturers are set to follow suit but the dismaying situation at the moment is that the IBM PC BASIC appears to be just a translated MBASIC with a few extras added.



The relatively poor performance of this 8086 BASIC compared to Apple BASIC seems to support this argument. The extra bits which would have had to have been coded in 8086 code from scratch seem to run quickly but the translated parts are slow compared to what should be achievable on an 8086/88.

Does this mean that we will be stuck with just another translation of MBASIC on all the new 16-bit machines? I hope not, but unless we start complaining about it now that may be the way things go!

Memory Drives

I've just been doing a reshuffle of my hardware associated with getting the Bulletin Board going and have just received lots of new goodies.

Finally the memory drive under CP/M 2.2 has been implemented. A memory drive (or MDRIVE) is a block of memory configured to look like a disk as far as CP/M is concerned.

The advantage is very fast operation due the lack of rotational latency associated with disk drives. Rotational latency is the time wasted while waiting for the specific sector you want to access to come under the disk head. The MDRIVE is also beautifully quiet.

The disadvantages are that a megabyte of memory is still much more expensive than a double-sided floppy disk and controller and that the storage is volatile — the data is lost when the power goes off.

I have only 192K (minifloppy users eat your heart out) in my MDRIVE but that is enough to hold an assembler/compiler, source and output files; all I need to achieve the speed benefits of the MDRIVE.

I PIP the file into the MDRIVE, do the

task at MDRIVE speeds and then PIP the result back to a floppy or hard disk for storage or use. I'll give you a fuller report on the effective speed increases over double density floppy disks when I've had a bit longer to do some meaningful measurements, but some quick tests with MAC on a large assembler file pointed to it being at least four times as fast.

As a comparison my hard disk is only about 1.5 times as fast (assemblers aren't as disk I/O bound as you might think).

In my system the extended memory is actually the main memory when running CP/M-86 but rather than let it go to waste when running CP/M-80 it can be put to good use in the MDRIVE.

My MDRIVE was implemented based on software from G&G Engineering in California. The same software is commercially available for S-100 systems from Godbout/compupro in the United States or from their dealers locally. The Godbout MDRIVE uses standard 24-bit addressing memory cards and requires that you have one of its 8085/8088 CPU cards.

Another US offering is called the Semidisk and is a single plug-in S-100 card that is said to work with any CPU. The price of memory is continuing to drop dramatically so I think we can expect to see MDRIVES appearing for many 8-bit systems over the next year.

Every time I mention them to Applied Technology, Owen Hill's eyes light up and he gives me a sly smile...does this mean an MDRIVE for the Microbee?

Amongst the new hardware was a Godbout dual CPU with a 7Mhz 8085 on board; I didn't even know they existed. What are the odds on a 10Mhz 8-bit processor within two years?

Also of interest was the Godbout Disk 1 with extra boot routines in the onboard ROM for the 8086 CPU card...it can't be far off now.

Concurrent CP/M-86

Well, the battle of the 16-bit operating systems just hotted-up again. Digital Research is ready to release a second version of CP/M-86 suited to multi-tasking applications.

Using the same real time nucleus as MP/M-86, concurrent CP/M-86 allows a single user to run multiple tasks on his 16-bit system. The console can be divided into a number of 'windows' which show output from various tasks.

Details are still a bit sketchy but this product seems set to top MS-DOS in the lower end 16-bit market. Stay tuned for details.

CP/M-80 Version 3

Yes, folks, it's still in the works...somewhere. Gary Kildall says you can blame it all on IBM — if it hadn't introduced the PC we would have seen CP/M 3 months ago.

Apparently many of the CP/M 3 project team were diverted onto the Concurrent CP/M-86 project so DR would have a competitive OS for the PC. Oh well, maybe by this Christmas...

Another recent offering from DR is XLT-86, a source code translator from 8080 assembly code to 8086 assembly code.

Does it work? Well, yes and no. First off there are a number of limitations which complicate the translation process. You can only translate source code which will produce a maximum of 6K of object code, so big programs have to be done in many smaller chunks and put back together again.

The translation is only done on the 'main line' code, so if you have lots of 'if' assembler directives in the 8080 program, only the enabled ones get translated.

However the program does endeavour to eliminate some redundant code sequences in the translated code that other

translators leave in and produces an excellent analysis of flag usage in the 8080 source code.

I tried it on some of my programs. A couple of simple programs ran right through without problems, were assembled with ASM86 and executed correctly. Some more complex programs required work before XLT86 would accept them and more work before ASM86 was happy but they did end up running.

I then tried a large 8080 disassembly of a sorted directory utility. Eventually got XLT-86 to accept it, however, and ASM86 to assemble it. It executes correctly when run under DDT-86 but not when run by itself...

Along the way I learnt quite a lot of new things about 8086 assembler programming (like how to handle the segment registers properly) and a few of the traps in translating programs. XLT-86 has limitations but even with some additional hand optimisation and adjustment it is still much, much faster than trying to do a hand translation and it is an excellent learning tool.

The CP/M Bulletin Board

First, my apologies for the delays in getting the service running. My unexpected time in hospital and following recovery threw the bulletin board plans badly out.

The system has been on-line to selected test users while the bugs were ironed out and the problems with using American programs on Australian communications systems resolved.

Telecom has also been rather slow in giving final approval. By the time you read this the system should be fully functional.

To obtain information on how to get onto the system send a large (A4 size) SSAE to:

CP/M Bulletin Board
P.O. Box 80,
Newport Beach, NSW, 2106.

The conditions outlined last month are still applicable.

Feedback

Send your questions about CP/M to Bill Bolton, CP/M Column, *Your Computer*, PO Box 2, Waterloo 2017. No guarantees that your question will get answered in the column but I will try. □

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mary, backup data disk, and end program.

Information stored on each stock item must include item number, description, selling price and quantity on hand, and may optionally include ADN code, bulk price, sales tax code, cost price, location, minimum balance, quantity on order and supplier.

The sales tax option in SCAP allows correct calculation of gross profit margins, taking the Australian sales tax system into account.

The SCAP manual is comprehensive in its explanation of the program, and describes the procedures to be used when setting the system up, customising it, and so on. The manual contains a listing of the program to allow later modification and the addition of extra features such as calculation of sales tax payments.

In much the same way as Osborne accounting software is not supported by Osborne and Associates, SCAP is primarily supported by software consultants, a list of whom is available at Dick Smith stores.

Invoicing System

The Invoicing System can be used independently, but is an ideal add-on for SCAP, with which it interacts.

The program will automatically generate invoices with your company name and address printed at the top, with automatic dating and numbering of invoices. It performs all calculations such as multiplying price by number of units sold and totaling the prices.

By entering quantities sold as negative, the program will automatically generate credit notes. At the end of each session, the program can print two reports: one showing customer name, invoice figure and other data; the other a tax and revenue totals summary.

When the program is used with SCAP, only the item number and quantity need be typed in, as the program will fetch the price, description and other information from the SCAP files, simultaneously updating the SCAP sales docket posting file.

Like the SCAP manual, the documentation for the Invoicing System is excellent, and includes a program listing, allowing customisation by the experienced programmer.

Word WOPP...

WOPP-9 is not the latest in a series of Star Trek games, it is in fact a word processing program for the Business Computer. The program will handle files up to 10,000 characters in length in a machine with 32 Kbytes of memory, and with 48K this increases to 26,000. Larger files can be manipulated by breaking them into sections.

WOPP-9 has two modes of operation:

Unit:	System 80 Business Computer
Made For:	Dick Smith Electronics
Processor:	Z-80
Clock Speed:	N/A
RAM:	16K-48K
ROM:	16K
I/O:	printer, serial port (option)
Languages:	BASIC
Keyboard:	QWERTY, numeric pad
Display:	64 × 16 u/l case
Graphics:	Chunky graphics
Peripherals:	Expansion box, disk drives
Expansion:	Optional serial port, S-100 (?) bus
Best Points:	Compatible with TRS-80
Worst Points:	5 mains plugs

Ratings:	excellent	verygood	good	poor
Documentation:			✓	
Ease of Use:		✓		
Functionality			✓	
Support:		✓		
Value-for-money:		✓		
Extras Included:	N/A			
Options:	NEWDOS/80 disk operating system			
Review Unit from:	Dick Smith Electronics			

command mode and enter/edit mode. These are toggled by the F1 key. In enter/edit mode, text can be rapidly typed in without regard to layout, line endings, and the rest as the print is 'tidied up' during the print phase. During entry, mistakes can quickly be corrected by backspacing and retyping, or left to be corrected later.

The editor has the usual selection of commands for cursor movement, text insertion, deletion and a search command. A holding buffer is provided for block moves.

The print formatter supports justification of text and proportional spacing, as well as adjustable margins and page length.

An interesting and unusual feature is the provision of a name and address file and the ability to merge names and addresses into letters. The name and address format is fixed at five lines, and may

not be suitable for more sophisticated direct mail applications, but is a good general purpose tool.

Once again, the manual is of good quality, and includes a glossary of technical terms. There is also a cut-out template which identifies the programmable function keys.

In general, the System 80 Business Computer represents good value for many small businesses. Although it is limited in disk capacity, it can be used to good effect in getting inventory and accounts receivable under control, while doubling as a word processor.

Because the manuals for SCAP and the Invoicing System contain source code, the programs can be modified and tailored to individual requirements, so that one is not completely helpless in the face of software problems. Altogether, a well put-together system. □

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Style: All items should be typed (or printed) and double-spaced on white paper. Include your name, address, telephone number and the date on the first page of your manuscript (all manuscript pages should have your surname and page number in the top right-hand corner). Be clear and concise, and keep jargon and adjectives to a minimum.

Listings: Unless it is absolutely impossible, we want listings produced on the computer. This reduces the risk of error — if the computer typed it, the computer probably accepted it.

Print listings with a dark ribbon on white paper. If they can't be produced on a printer, borrow a typewriter — hand-written material is likely to sit around the office for a year before someone can find time to type it all out for you! Please provide an account of what the program does, how it works and so on. Any comments on the program should refer to the address, line number or label rather than to a page number. Any comments on modifying the program to work on other machines will be appreciated. Try to include a printout of at least part of a sample run if possible.

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